THE MARK PROCESS DRYER COMPANY

GENERAL OFFICES. FISHER BUILDING

CHICAGO. ILL.

Santa Barbara, S. Pedro, S. D.

IN BULLETIN #150
DEPARTMENT OF AGRICULTURE,
JANUARY 23rd, 1915.
BY J. W. TURRENTINE,
SCIENTIST IN SOIL LABORATORY INVESTIGATION.
REPORTS ON THE GIANT KELPS OF THE ATLANTIC AND PACIFIC.

IT SAYS. That: The nerocystis is an annual whose seasonal growth attains an average of 50 feet. * * * It is estimated that after a cutting, a grove resumes its original condition after a lapse of 40 to 60 days. * * * The important groves from the Mexican boundary to the Canadian line on Puget Sound during the past three years have been measured and mapped to scale; likewise, the important groves of South-western and Western Alaska have been surveyed. As a result of the three years' work, it is known pretty definately what the available quantities of kelp are in the various sections of the coast. * * * Puget Sound Groves 390,000 tons of wet kelp per year. * * * Strait of San Juan de Fuca 85,000 tons. * * * Opposite Santa Barbara 320,000 tons. * * * Near San Pedro 194,000 tons. * * * Near San Diego, 633,000 tons. * * * Southeastern Alaska - 8,000,000 tons. * * * States of New Hampshire, Vermont, and Massachusetts - 2,880,000 tons. * * * Western Alaska, 3,500,000 tons. (And this is not all) the above total amounts to sixteen million, two thousand tons of wet kelp that could be harvested annually.

IT SAYS. That: For several years past kelp has been harvested mechanically near San Pedro, Cal., and shipped in the crude, undried condition to the ranches and orchards of that part of the State. * * * For that reason any scheme for the large-scale utilization of kelp as a fertilizer must be based on some method of concentrating its valuable constituents. Since all of these are either nutral or beneficial from a fertilizer point of view, it is necessary only to concentrate them by the removal of the water, or in other words by drying. * * * It appears that kelp, in the beginning at least, most advantageously can be prepared for the fertilizer trade merely by drying and grinding. * * * The pulverized kelp, then, would contain 15.8 per cent potash and 1.6 per cent nitrogen. On the retail market of the Pacific Coast States, the prices of $1 per unit of potash and $3.30 per unit of ammonia are obtainable. On this basis the value of the kelp per ton is

arrived at, as follows;

(Potash)	
15.75 per cent KO at $1 - - - - - - - - - - -	$15.75
2 (Ammonia)	
2.18 per cent NH at $3.30 - - - - - - - - -	7.19
3	
Total value per ton - - - - - - - - - - - - - - - -	$22.94

IT SAYS. That: The cost of cutting will be determined by the conditions obtaining at the place of cutting, * * * and easily may be reduced to 25 cents or less, inclusive of unloading at the dock.

IT SAYS. That: As the green kelp, after draining, contains about 85 per cent of water, * * * the drying would not be quantitative; that is, a certain proportion of water would be allowed to remain, probably * * * 10 per cent. * * *.

Deductions on the above are as follows: So far, there has not been a dryer (except the Mark Dryer) that can dry kelp. On the basis of the above the amount of available kelp amounts to over sixteen million tons annually, and when dried would represent over four million tons of the marketable product, and at twenty two dollars and ninety four cents per ton, would amount to ninety one million seven hundred and sixty thousand dollars annually. These figures are stupendious, but are based upon the showing made in the report above.

Upon advise of Professor Turrentine, we wrote a letter to two places in California, requesting them to send us a cask full of the kelp for demonstration. They complied with the request, and we have made a very exhaustive test of drying the kelp, and can report that it is as easy to dry by the Mark Process, as any other material we have ever demonstrated upon. We have the dried samples in our office for inspection, and have forwarded complete samples to the U.S. Government, J.W. Turrentine, in charge, and to the University of California. Also to the parties who sent us the cask of kelp.

We consider the drying of kelp, by the Mark Process, a success beyond any question of a doubt, and at a price that enables the product to be sold at a competing price with any other product of a similar nature, and for a similar use.

June 23, 1915.

Very truly,
THE MARK PROCESS DRYER COMPANY.

Account		Road	Furnace	Fuel	Kelp	Labor	Incid.
1 Frank Cameron	Bars		2.00				
2.S.D.& L.A.R.R.	Frt.		8.00				
3.F.L.Hiatt	Brick		42.14				
4.Geo.Laurence	Haul		3.70				
5.W.C.Crandall	Labor						25.00
6.Raymond Young	Labor	40.30					
7.Joseph Griffin	Labor	37.82					
8.Jack Reardon	Labor		4.80				
9.Pat Duffy	Labor		4.80				
10.J. Campbell	Labor		62.75				
11.Wm La Fond	Labor		6.00				
12.WmLa Fond	Labor		7.20				
13.La Jolla Trans.	Haul.		4.50				
14.Hartwell Elect.	Motor		23.13				
15.L.J.Lumber	Lumber	12.76	50.00				
16.Union Oil Co.	Dist.			24.00			
17.S.H.Breese	Team	36.00					
18.Pac.Hard.	Fittings		66.82				
19.Cal.Iron Wks.	Doors		120.00				
20.S.D.C.G.&E.	Brake Bars		4.50				
21.Geo.Laurence	Haul		1.50				
22.C.J.Bentson	Iron		11.50				
23.S.D.C.G.&.E.C	Bars.		46.00				
24.Raymond Young	Labor					29.76	
25.Joe Griffin	Labor					26.66	
26.J.Henderson	Labor					10.05	
29.Pat.Duffy	Labor					3.75	
30.J.Henderson	Labor					12.30	
31 R.C.Terrill	Labor					12.00	
32.L.H.Manville	Team.	85.55					
33.W.C.Crandall	Incid.						25.00
34.W.G.Holston	Kelp				55.00		
35.S.D.C.G.&.E.	Eleect			12.05			
36.Caretson Man.	Sacks				5.10		
38.Erling Rohde	Fittings		8.93				-7.85-
37.Union Oil Co.	Oil			24.00			
39.La Jolla Hdw.	Tubs						7.25
40.S.H.Breese	Haul				2.50		
41.HartwellElect.	Rent.		5.00				
42.La Jolla Lumber	Lumber		9.00				
43.Pac.Hard.Co.	Fittings		23.11				
44.C.E.Anthony	Analysis						78.41
45.S.D.C.G.&.E.	Elect.			5.83			
46.Frank Cameron	Burner		10.00				
47.Cal.Iron Wrks.	Plates		105.95				
48.Erling Rohde	Fittings		4.40				
49.Union Oil Co.	Dist.			36.00			
50.L.H.Manville	Haul					41.88	
		212.43	630.73	106.88	104.48	119.52	110.66

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

Account		Road	Furnace	Fuel	Kelp	Labor	Incid.
		212.43	630.73	106.88	104.48	119.52	110.66
W.G.Holston	Kelp				25.00	~~25-~~	~~-11~~
52.W.C.Crandall	Incid.						11.63
53 L.J.Hdw.Co.	Fittings		1.75				
54. S.H.Breese	Haul						5.50
55.H.T.Elsey	Labor					6.25	
56.S.D.Hdw.Co.	Elect.			1.84			
57.Pac.Hadw Co.	Rent.		12.25				
58.Hartwell	Elect.Rent		3.00				
		212.43	647.73	108.72	129.48	125.17	127.79

Receipts	1500.00	Disbursements	1351.92
		Bal on hand	148.08
			1500.00

Outstanding Bills

L.H.Manville 14.10

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

Samples for Analyses.

1 - No 1, screenings of original mass -

2 - — ash from second burning.

3 - #10, Remainder after screening original ash.

4 - #17, Exp. B, residue from 1st lixiviation.

5 - #13, Exp. A, filtrate from original lixiviation.

6 - #14, Exp. A, 2nd filtration of original mass at near boiling point.

7 - #18, salts thrown down in evaporation of #14.

8 - #16, " " " " " " #13.

9 - #9, clean from furnace.

10 - #15, Exp. A, residue from original lix.

11 - — 2nd clean of ash from 2nd burning.

12 - Furnace ash from first burning.

Established Facts:

1. That there is an abundance of kelp and will continue to be under harvesting.

2. Kelp contains a mixture of Potassium Chloride and Sodium Chloride in the proportions of 3 KCl : 1 NaCl and a very much smaller proportion of sulphates.

3. The separation of potassium chloride from kelp salts is far easier and cheaper to accomplish than the separation of potassium chloride from any other known salt mixture, either natural or artificial.

4. The separation of potassium chloride from the other kelp salts has been shown to be easily accomplished.

5. It has been demonstrated practically that the preparation of kelp salts or ash can be accomplished on a commercial scale at reasonable cost. See appendix on ashing.

6. Kelp offers at present the only practicable source of potash slats for America.

7. Potash from kelp industry offers

   a. The utilization of a resource of the State.

   b. A supply of a national need.

   c. Will make money.

8. Eastern capital is attracted to "Potash From Kelp" but hesitates

   a. For fear of competition.

   b. For fear of adverse State legislation.

Ashing of Kelp:

Of the various processes that have been suggested, the reduction by one of three types of furnace commends itself as practicable

1. The bank furnace (Scripps, Crandall Cameron.) offers theoretically the most advantages. In its present form the furnace is a failure because of the fact that the wet kelp does not shrink from the heating surface as anticipated but mats down to a dense compact wet mass and the outer coating

of dreid material acting as a protection to the wet mass in the interior. Cameron thinks that the furnace can yet made efficient but it would require undoubtedly further and prehaps extensive experimentation.

2. A rotating furnace on the principle of the modern lime kilw or cement furnace would be expected to burn efficiently the kelp in one opperation. It has not actually been tried.

3. The drying of kelp the dried kelp in a rotating drier and the subsequent burning or charring of the dried kelp is theoretically less desireable than either of the foregoing processes because it is essentially a two step process. It has however the advantage that it has been demonstrated in actual practice as feasible and inexpensive in opperation.

Recommendations:

In view of the facts above set forth and believing further that none of the kelp companies so far announced have any actual future and that Eastern capital will be long defered from entering this field, it would seem that the only reasonable hope for an early supply of potassium salts lies in the consummation of a company along the lines of the tentative agreement prepared hitherto by Messrs. Scripps, Crandall and Cameron.

In view of the emphatically stated objection of Mr. Scripps to prolongeg experimentation or experimentation along more than one line, and for the further fact that an early supply of potassium salts is urgently demanded, it would seem best to proceed to the establishment of a plant along the line three as having been demonstrated as being already practicable and profitable. To this end the following estimates have been submitted.

Permanent Equipment.

Boats and barges

2 boats	@	$5 000	10 000	
3 barges		2 500	7 500	
1 harvestor		2 000	2 000	$ 19 5000

Permanent Equipment Boats barges,etc	$ 19 500
Site and Landing	15 000
Dryer 2 @ 6 000	12 000
Incinerator	2 000
Crystallizing vats,pump and plumbing	1 200
Store house,office and laboratory	5 000
Engine and accessories	2 500
	$ 57 200

Current expense per wet ton.

Harvesting @.25	$ 0.25
Fuel (0.425 bbl.) @ .85	0.36
Labor 15 men in double shift	0.10
Overhead	0.10
Interest (7%) insurance,depreciation, (10%) taxes	0.07
	$ 0.88

At 4% KCl ,therfoe $22.00 per ton cost of production. 25.88

Confidentially obtained estimates secured from two engineers of practical experience of ecognized standing,which esti ates were made for others.

E.E.P. $1.07 or 26.75 per ton KCl.

W.M.A. 1.10 Or 27.50 " " " .

At 85% unit for potashand abowe cost production net powould exceed $30 per ton. A production of 16 tons per day for 250 days would aggregate 4000 tons showing an annual profit of $120 000 on an investment of $57 200 or nearlt 210 percent.

Momeorandum ofresults of Investigati n.

PHONES { MAIN 4360
F 3883

LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.

LOS ANGELES, Jan.15th,1915.

Laboratory No. 2159
Mark: Furnace water from first burning.
Description: Liquid. *Analysis made by:* R.O.Wrana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego,Cal.

FURNACE WATER
contains

Mineral matter pro gallon.....0.49 lbs.

Acetic acid.....0.26% by Vol.

ANALYSIS
of
MINERAL MATTER

Potassium oxyde(K_2O).....37.60%

Sodium oxyde(Na_2O).....14.61%

Chlorine(Cl).....40.28%

Sulphuric anhydride(SO_3)..... 3.12%

Carbon dioxyde(CO_2)..... 0.25%

SO_3 combined with CaO to $CaSO_4$.

Na_2O : K_2O = 1 : 2.57.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
F 3883

LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2158
Mark: No.17 ExpA Residue from first lixivation.
Description: Residue. *Analysis made by:* R.O.Wrana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....26.95%.
Sodium oxyde(Na_2O).....10.13%.
Chlorine(Cl).....20.52%.
Sulphuric anhydride(SO_3)..... 5.32%.
Carbon dioxyde(CO_2)..... 1.23%.

$Na_2O : K_2O = 1 : 2.66$.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2157
Mark: No.14 2nd filt.of original mass at near boiling point.
Description: 2nd Filtrate. *Analysis made by:* Rowana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

FILTRATE

Spec.Grav.at 15°C.....1.1030

contains

Mineral matter pro gallon.1.43 lbs

ANALYSIS
of
MINERAL MATTER

Potassium oxyde(K_2O).....38.92%

Sodium oxyde(Na_2O).....11.97%

Chlorine(Cl).....29.47%

Sulphuric anhydride(SO_3.....10.16%

Carbon dioxyde(CO_2).....0.27%

Some $CaSO_4$ in solution.

Na_2O : K_2O = 1 : 3.25.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.

LOS ANGELES, Jan.15,1915.

Laboratory No. 2156

Mark: No.13 Filtrate from original lixivation.

Description: Filtrate. *Analysis made by:* R.C.Wrana

Received: 12/30/14.

Submitted by: Mr.C.E.Anthony,

San Diego, California.

FILTRATE

Spec.Grav.at 15°C.....1.1795.

contains

Mineral matter pro gallon..2.33 lbs.

ANALYSIS
of
MINERAL MATTER

Potassium oxyde(K_2O).....44.09%.

Sodium oxyde(Na_2O)..... 9.73%.

Chlorine(Cl).....40.20%.

Sulphuric anhydride(SO_3)..... 5.20%.

Carbon dioxyde(CO_2)..... 0.57%.

No $CaSO_4$ in solution.

$Na_2O : K_2O = 1 : 4.53$.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
F 3883

LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2155
Mark: ExpA No.18 Salts thrown down in evap.No.14.
Description: Salts. *Analysis made by:* R.O.Wrana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....36.61%.
Sodium oxyde(Na_2O).....15.76%.
Chlorine(Cl).....29.95%.
Sulphuric anhydride(SO_3..... 8.72%.
Carbon dioxyde(CO_2)..... 1.23%.

$Na_2O : K_2O = 1 : 2.32$.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.16th,1915.

Laboratory No. 2152
Mark: ExpA No.10
Description: Klinker
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego,Cal.

Analysis made by: R.O.Wrana

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O)	26.47%
Sodium oxyde(Na_2O)	8.67%
Chlorine(Cl)	21.24%
Sulphuric anhydride(SO_3)	3.87%
Carbon dioxyde(CO_2)	1.69%

$Na_2O : K_2O = 1 : 3.05$

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.

LOS ANGELES, Jan.15,1915.

Laboratory No. 2154
Mark: No.15 ExpA Res. orig. lixivation.
Description: Residue. *Analysis made by:* R.O.Wrana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

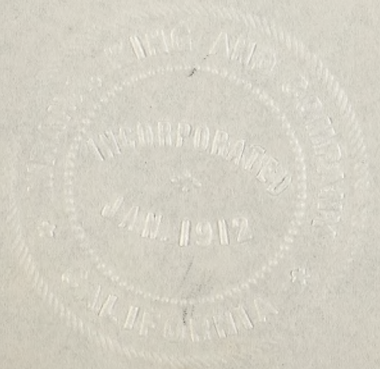
ANALYSIS
of
MINERAL MATTER

Potassium oxyde(K_2O).....19.42%.
Sodium oxyde(Na_2O).....15.34%.
Chlorine(Cl).....16.78%.
Sulphuric anhydride(SO_3)..... 6.44%.
Carbon dioxyde(CO_2)..... 0.45%.

Na_2O : K_2O = 1 : 1.26.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.



PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2148
Mark: No.1 Screenings of original mass.
Description: Screenings. *Analysis made by:* R.O.Rowand
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....23.21%.
Sodium oxyde(Na_2O).....12.36%.
Chlorine(Cl).....20.88%.
Sulphuric anhydride(SO_3).... 5.52%.
Carbon dioxyde(CO_2)..... 0.97%.

$Na_2O : K_2O = 1 : 1.88$.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2153
Mark: ExpA Salts thrown down in evap.No.13
Description: Salts. *Analysis made by:* Rowana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....46.08%.
Sodium oxyde(Na_2O)..... 8.28%.
Chlorine(Cl).....39.60%.
Sulphuric anhydride(SO_3)..... 4.97%.
Carbon dioxyde(CO_2)..... 0.44%.

$Na_2O : K_2O = 1 : 5.56$.

Respectfully,

Wrana, King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.

LOS ANGELES, Jan.15,1915.

Laboratory No. 2149
Mark: No.2 Ash from second burning.
Description: Ash.
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

Analysis made by: R.Owrana

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....20.30%.
Sodium oxyde(Na_2O).....18.95%.
Chlorine(Cl).....23.62%.
Sulphuric anhydride(SO_3)..... 6.44%.
Carbon dioxyde(CO_2)..... 0.54%.

$Na_2O : K_2O = 1 : 1.07$.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.15,1915.

Laboratory No. 2150
Mark: 2nd Char of ash from second burning.
Description: Char of ash. *Analysis made by:* Rowana
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego, California.

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....24.90%.
Sodium oxyde(Na_2O).....17.95%.
Chlorine(Cl).....26.42%.
Sulphuric anhydride(SO_3)..... 6.96%.
Carbon dioxyde(CO_2)..... 0.35%.

Na_2O : K_2O = 1 : 1.38.

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

PHONES { MAIN 4360
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LABORATORY CERTIFICATE

WRANA, KING & COMPANY
INCORPORATED
822 EAST THIRD ST.
LOS ANGELES. Jan.16th, 1915.

Laboratory No. 2151
Mark: ExpA No.9 Char.
Description: Char
Received: 12/30/14.
Submitted by: Mr.C.E.Anthony,
San Diego,Cal.

Analysis made by: R.Crana

ANALYSIS
of
MINERAL MATTER.

Potassium oxyde(K_2O).....34.94%
Sodium oxyde(Na_2O).....10.73%
Chlorine(Cl).....28.94%
Sulphuric anhydride(SO_3)..... 6.28%
Carbon dioxyde(CO_2)..... 1.15%

$Na_2O : K_2O = 1 : 3.25$

Respectfully,

Wrana King & Co.
ANALYTICAL & CONSULTING CHEMISTS.

C. E. ANTHONY, M. E.
ASSAYER, CHEMIST AND REFINER
LABORATORY, 858 FOURTH STREET

TELEPHONE, HOME 3465

SAN DIEGO, CAL., Dec 23 1914.

Mr H G Brandall.
La Jolla
Calif.

Dear Mr Brandall.

Please find herewith letter from Hirama, King & Co. in reply to my request for terms &c.

Prices seem very low to me. What do you think?

If you decide to let them have samples, please bring them in to me and I will have them attended to at once. Kindly return the inclosed letter.

Yours very truly
C E Anthony

C. E. ANTHONY, M. E.
ASSAYER, CHEMIST AND REFINER
LABORATORY, 858 FOURTH STREET

TELEPHONE, HOME 3465

SAN DIEGO, CAL., Jany 18th 1915

W. L. Crandall
Biological Station
La Jolla
Calif.

My Dear Sir.

I am just in receipt of reports and letter from Wrana King & Co. the letter I enclose. The reports, Consisting of 3 big packages, await you, please Call when Convenient

Yours Very Truly
C. E. Anthony.

AGRICULTURAL CHEMISTRY
JOHN S. BURD, CHEMIST IN CHARGE

IDE WHEELER, PRESIDENT
AS FORSYTH HUNT, DEAN AND DIRECTOR
'AN NORMAN, VICE-DIRECTOR AND DEAN
UNIVERSITY FARM SCHOOL

anuary 19,1915.

Mr. W.C.Crandall,
Scripps Marine Biological Station,
La Jolla, California.

My dear Mr. Crandall:-

Our division has been requested to prepare the fertilizer exhibit for the Office of Experiment Stations in the Panama-Pacific Exposition. The space to be occupied is quite small consisting of one case some 5 feet long, 3 feet wide and 5 feet high. We, however, wish to put in a little kelp as a portion of this exhibit.

Do you now have a small boat available at the station so that a little Macrocystis could be conveniently obtained? We desire to get five or six typical strands of fresh Macrocystis, each about eight or ten feet long, packed firmly in a box and shipped to us C.O.D. by express the same day that it is taken from the ocean. Any expense connected with obtaining this would be gladly paid by us. I am sorry to trouble you with this matter, but it involves our sending some one to Pacific Grove or Santa Cruz with great uncertainty as to their getting the kelp even then. It occurred to me that your landing facilities may possibly be improved so that you could obtain it without difficulty.

Trusting we are not imposing on you,

Very sincerely,

GRS/P

Guy R. Stewart

UNIVERSITY OF WASHINGTON
SEATTLE

BOTANY
THEODORE C. FRYE, PH. D., MORPHOLOGY
GEORGE B. RIGG, PH. D., PHYSIOLOGY
JOHN W. HOTSON, PH. D., PLANT DISEASES

ASSISTANTS
ETHEL BARDELL, M.S.
VINNIE PEASE, B.S.
JESSIE NEIKIRK, B.S.
LOLA EDWARDS, A. B.
MABELL AMIDON, B. S.
HENRY SCHMITZ

BACTERIOLOGY
JOHN WEINZIRL, PH. D., BACTERIOLOGY

ASSISTANT
D. H. NICKSON, B. S., PATHOLOGY

January 20, 1915.

Captain W. C. Crandall,
Scripps Inst. for Biol. Research,
La Jolla, Calif.

My dear Capt. Crandall:

I am sending you by this mail a copy of our paper on the size of kelp on the Pacific Coast. I shall expect of course, that you will alter and add to any portions of this paper where changes or additions may seem to you to be necessary. Particularly is this the case in the paragraph dealing with your part in the work. I knew of course, only in a general way about the length of your experience etc., on the west coast. I shall send the paper to a journal for publication just as soon as the revision is complete.

Very sincerely yours,

GBR-AS

Geo. B. Rigg

Feb.12th 1915.

Dr.G.B.Rigg,

Seattle Wash.

My dear Dr.Rigg:

I must beg too much work during the last few weeks as the excuse for not taking up the paper that you sent. Dr.Cameron has been here for some time and we yave been doin some work along the lines of burning and that together with my necessitated work with our legislature has taken all of my time. However I find the following original data that I have taken that refers to the work that you have done. The sea has been so rough here during the last few weeks that it has been impossible to get further data.

Macrocystis pyrifera Santa Barbara Length 76 ft. wgt. 501bs.

" " 85 ft. 81#

#1 Sept.12 1912. Monterey 60 ft.

#2. 50 ft.

	Nereocystis	Pacific Grove	Fronds or Leaves	Wgt.	Length	Diam bulb
1.	Sept. 21st.1912.		9 ft.	20#	24 ft.	5 in.
2.			9'	10½#	24'	3½"
3.			12'	30#	120'	5½"
4.			6'	16½#	126'	4"
5.			6'	15½#	114'	3¾"
6.			9'	14	114 ½	3¼"
7.			6'	15¼#	18'	4"
8.			6'	13	19'	4"
9.			12'	14½#		3¾"
10.			18'	33#		5¼'.

Depth on inside of grove 8to 20 ft.
Depth on outside of grove 8½-9 fathom. or 54 ft.

Aug. 30th. Oxford Reef. Fronds 6-8" wide 18-25'long Diam.bulb 4"
Diam stock for diatal 10 ft. 4" of next 15 ft. 2 in. Wgt. 45#.

I found that the Mac.p.grew into as shallow as 2½ fathoms while still retaining a definite holdfast but the it grew in shallower depths in which case the holdfast is more like a rhizome. This condition may be seen at

Pacific Grove. I have not seen this condition along the coast here and recently there has been a good opportunity to see unusual conditions on account of the large amount of kelp that has come ashore after the high seas. There have been many entire plants coming ashore but it has been impossible to weigh them because of the sand that is picked up and carried upon them.

Yours truly,

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

February 16, 1915.

Prof. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

I reached Washington Sunday and found your note of the 6th with enclosures yesterday. I enclose a check covering the amount in the two vouchers.

I met Brander in San Diego and had a long talk with him and went over the situation at Long Beach with him. It seems that he was in sympathy with Tanner and very much opposed to Gleason, whom he suspected of ulterior motives. I told him I thought he was wrong and gave him a lot of good advice, the sum and substance of which was that they ought to put in their energies on making dried kelp.

On reaching Los Angeles I looked up some of the phosphate people and was tied up with them until nearly noon and had just time to catch the car to Long Beach. At Long Beach I saw Tanner and the Superintendent. Oppenheim had left the day before, saying that he had thrown up his job and was looking for another one. They seemed to be very glad to be rid of him. I talked with them about the desirability of their marketing the dried kelp. Tanner immediately got excited and proposed to sell what they had on hand, which turned out on inspection to be two or three tons. I advised him very strongly to wait until he had fifty tons at least and then go to the American Agricultural Corporation. They had their new cutter and harvester undergoing repairs at the

wharf. Early in the morning when I had first arrived at Los Angeles I had gone to Strous[illegible] office and found that Strous had applied for a patent on a kelp harvester and when he showed me the plans I immediately told him that I suspected that it was the American Potash Company's. I am strongly of the opinion that they wont succeed in getting the patent, and it wont make any difference as it is of no very great importance. Anybody can use the harvester since it is described in detail in our kelp bulletin. As I was leaving the ~~car~~ plant I met Gleason. He went back with me on the car as far as the transfer station at Long Beach and gave me his side of their troubles. He was at that time of the opinion that they would have a change of heart within a day or two and reinstate him in the Presidency of the Company, in which case he thought he could still save them. If they did not do this, he expected them to completely fail and be in the hands of a receiver inside of ten days. I am rather curious to know how things have turned out with them and hope you will keep me posted from time to time.

The kelp bulletin ought to be out. The proofs have all been read and I understand the maps have been printed and the only thing that is delaying is the proof of the cuts. Why these have not been returned I cannot apparently find out.

Concerning the work that we did together at La Jolla, I will want to write you again in a day or two after I have gone over the situation a little more fully here.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

Enclosure.

Feb.25th 1915.

Mr. J.C.W.Stanley,

1151 So.Hope St.,

Los Angeles, Cal.

Dear Sir:

Your letter of the 22nd is at hand. The information that you desire is about ready for distribution by the Dept.of Agriculture, Bureau of Soils, W shington D.C. Your questions could best be answered if you ta e the constants given and then work out the probable out ut from the area that you would desire to work from. These figures should be checked over as the quantity may differ very considerably during successive years and I have not seen the beds except in 1912.

Below is a summary of the beds adjacent to Santa Cruz at that time,

	Heavy	Medium	Thin.
Pt. Ano Nuevo- Big Gulch		2 112 000 sq.yds.	
Big Gulch - Swanton		25 000	
Scotts Cr.-Williams Land.		13 000	
Williams Land-Sand Hills Bluff			352 000
Sand Hill Bluff-Table Rk.	176 000		
Table Rk. - Pillar Pt.	880 000		
Pillar Pt- Santa Cruz		1 320 000	
Twin Lakes - Capitola		1 500 000	
Pt.Aulon - Aumentos Rk.	308 000		
Whistler - Cypress Rks.	470 000		
Pescadero Pt.			1 584 000
North Half Carmel Bay	720 000		
Carmel Mission	40 000		

#2. J.C.W.S.

The above figures are given for square yds.

In computing the amount of potash we take the follwoing constants:

Average weight of kelp per cu.yd. 30 lbs.

Percentage of water present 85%

Percentage of Potash present in wet kelp about 4%.

From the above data you can work any of the district up that you desire.

I should now use # 3% for potash content rather than 4% as a working b basis.

Figure on cutting to a depth of 2 yds.

Trusting that the above will be of use to you, I am

Yours truly,

WESTERN UNION

Form 2289

NIGHT LETTER

GEORGE W. E. ATKINS, VICE-PRESIDENT NEWCOMB CARLTON, PRESIDENT BELVIDERE BROOKS, VICE-PRESIDENT

RECEIVER'S No.	TIME FILED	CHECK

SEND the following Night Letter, subject to the terms on back hereof, which are hereby agreed to

Dec. 4th 1915

Dr. Frank K. Cameron,
Bureau of Soils,
Washington, D.C.

Can you send me at once the number of the document containing the Kelp Investigation? The California legislature needs it in framing their bill on harvesting Kelp concerns just starting at Santa Cruz. Leave tomorrow for Los Angeles to investigate the A. P. Co.

W. C. Crandall

Official Business
W. C. Crandall

La Jolla, Cal.
Telephone Sunset La Jolla 36 W.

ALL NIGHT LETTERS TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

The Western Union Telegraph Company will receive not later than midnight **NIGHT LETTERS**, to be transmitted only for delivery on the morning of the next ensuing business day, at rates still lower than its standard night telegram rates, as follows: The standard day rates for ten words shall be charged for the transmission of fifty words or less, and one-fifth of such standard day rate for ten words shall be charged for each additional ten words or less.

To guard against mistakes or delays, the sender of a night letter should order it REPEATED, that is, telegraphed back to the originating office for comparison. For this, one-half the unrepeated night letter rate is charged in addition. Unless otherwise indicated on its face, THIS IS AN UNREPEATED NIGHT LETTER AND PAID FOR AS SUCH, in consideration whereof it is agreed between the sender of the night letter and this Company as follows:

1. The Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any UNREPEATED night letter, beyond the amount received for sending the same; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any REPEATED night letter, beyond fifty times the sum received for sending the same, *unless specially valued;* nor in any case for delays arising from unavoidable interruption in the working of its lines: *nor for errors in obscure night letters.*

2. In any event the Company shall not be liable for damages for any mistakes or delay in the transmission or delivery, or for the non-delivery, of this night letter, whether caused by the negligence of its servants or otherwise, beyond the sum of FIFTY DOLLARS, at which amount this night letter is hereby valued, unless a greater value is stated in writing hereon at the time the night letter is offered to the Company for transmission, and an additional sum paid or agreed to be paid based on such value equal to one-tenth of one per cent. thereof.

3. The Company is hereby made the agent of the sender, without liability, to forward this night letter over the lines of any other Company when necessary to reach its destination.

4. Night letters will be delivered free within one-half mile of the Company's office in towns of 5,000 population or less, and within one mile of such office in other cities or towns. Beyond these limits the Company does not undertake to make delivery, but will, without liability, at the sender's request, as his agent and at his expense, endeavor to contract for him for such delivery at a reasonable price.

5. No responsibility attaches to this Company concerning night letters until the same are accepted at one of its transmitting offices, and if a night letter is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.

6. The Company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing within sixty days after the night letter is filed with the Company for transmission.

In further consideration of the reduced rate for this special **"NIGHT LETTER"** service, the following special terms are hereby agreed to:

A. **NIGHT LETTERS** may at the option of the Telegraph Company be mailed at destination to the addressees, and the Company shall be deemed to have discharged its obligation in such cases with respect to delivery by mailing such **NIGHT LETTERS** at destination, postage prepaid.

B. **NIGHT LETTERS** shall be written in plain English. Code language is not permissible.

7. *No employee of the Company is authorized to vary the foregoing.*

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NIGHT LETTERS

Accepted up to midnight for delivery on the morning of the next ensuing business day, at rates still lower than standard night telegram rates, as follows: The standard day rate for 10 words shall be charged for the transmission of 50 words or less, and one-fifth of such standard day rate for 10 words shall be charged for each additional 10 words or less. Must be written in plain English. Code language not permissible. Mail delivery, postage prepaid, permissible.

UNIVERSITY OF CALIFORNIA
MECHANICAL ENGINEERING
BERKELEY

Berkeley, Calif. Mar.9,1915.

W.C. Crandall,
La Jolla, Calif.

Dear Sir:-

You will, I believe, recall a talk you had with me last December in Los Angeles, regarding kelp. I would like your cooperation in further investigation of the subject.

I have taken the design of a kelp reduction plant as my thesis subject for B.S. in Mechanical Engineering. My intention isto design a complete floating plant to produce dry ground kelp with the least labor possible, reaching into a study of the commercial possibilities of a floating plant. After making a rather careful study of all the work which has gone before this time I am convinced such a plant presents the only possibility of an industry being established. I can prove whether or not such is the case to my own satisfaction, though I hope to some others also.

There seems to be such a variance of opinions as to the value of the kelp measured in dollars and cents that I am a little perplexed what value to use as a basis for evaluating a plant. I would like your opinion of the market value of a ton of wet kelp as harvestable about Point Loma. I should also like to know how many cubic feet per ton you think such kelp would average,(wet and dry).

I will greatly appreciate any suggestions of any nature you might care to give me about such a plant, and would like your permission to forward in a fewweeks drawings of a kelp chopper for your criticism.

Thanking you for any ideas you care to send me,

I am
Yours very truly,

1920 University Ave.
Berkeley, Calif.

Heman Greenwood.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

La Jolla Cal. Mar.10th 1915.

Dr.Frank K.Cameron,

Washington,D.C.

My dear Dr.Cameron:

I am surprised that the kelp has not arrived as it was sent off immediately by express and should have been there a couple of weeks ago. If it has not arrived as yet,let me know immediately and I will either ha that found or get another sample that I fear would not be good as the rain would have had a chance at it probably.

Now for a tale of woe:

Last Friday morning I went to Los Angeles as per your letter to look up the Am.Pot.Co. and incidentally to see the others. Found that I had doubled on Gleason as he h d just come down here but would return on Sunday That gave me a good chance to go after the other fellows and I found out that things were in another peculiar state of affairs:

I first saw Fischer and Metz of the Pacific Products Co. Since November they have been negotiating for a site. As I wrote you during th winter,they were expecting to close a deal at LongBeach fo slip #2. On ac count of the silt that was there they were asked to choose a place on #3. Then this fell through and then they went over to Wilmington near Lomans place and got a lease from the Banning people. When they started to build anwharf,they were stopped by the City of Los Angeles because they would no give them a permit as the City of Los Angeles was at the time in a lawsuit with the S.P.and the Banning people as to the title of the land that was made at the time that the dredging was done and which added acres in fro t of the land that was held by title by the above companies. Result was tha they had to stop work entirely and the matter has been dragging along for

the last three months without anyone getting anywhere in the deal. Also an old ordinance was dug up which prevented the utilization of any land on Los Angeles Harbor being used for making fertilizer from animal or plant sources or manufacturing productts to be used in the manufacture of the sam This put another face tothe dealing and it will now be necessary for the City Council to make an amendment before they can go ahead even after they have gotten hold of a clear title. So they are doing nothing and have put the workings of their company in the hands of a committee of fi-ve from the stockholders who are trying to work out a solution. The point is here that firms who are trying to locate at San Pedro or Wilmington at the present time cannot do so except for docking purposes and the n under such restrictions that there is no new business in the lumber and manufacturring business going in there at the present time. Its a whole hog or none game with Los Angeles which now controlls that situation.

Then I went over and saw the Pac.Kelp Mulch Co. i/e/their old headquarters. They had moved and I was unable though I tried several times to catch Mr.E.C Hutchinson who is the Sec. at the present time. However I talked with G.M.Bernstein who is still associated with them altho he has given notice that he wishes to withdraw. Their annual meeting was held on Jan.10th and the following were elected to office.

W.T.Perkins Pres. T.J.Stevens vice -pres. G.M.Bernstein Treas.
E.C.Hutchinson Sec. Directors J.T.Scott Mr.Wakeling.
Jno.T.Poole is Attn'y. Offices are at #227 Higgins Bldg. L.A. They still have their site at Terminal Island but are doing nothing there now.

Bernstein told me that Perkins was going to the financing and

through.

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

Then I drew the surprise of the trip for the other part of the crowd that had been in the P.K.M.CO. and the c rporation that died a borning the Consolidated Potash Company ,had reformed or rather had fromed a new compa ny the "Potassium Manufacturing Corporation. This com any was formed and incorporated on Mar.1st 1915. At present they have had no meeting for the election of officiers but they have some very nice stationary of which I am sending you the heading. I took notes on the rest of it so as to get a ~~pie~~ piece without ostentation. They had no information to give out as usual although they had come out in the papers a short time before and stated that they were figuring on locating at El Secundo which is between Redondo and Santa Monica and was the place where the Standard Oil lost 1800 feet of wharf about ten days ago, The incorporators were

E.F.Bernstein	250 share	@ 1.00
James T.Armstron	250.~~00~~	@1.00
William E.Wellhause	1 share	@ 1.00
H.H.Huntzberger	1	1.00
John W.Huntzberger	1	1.00

The papers were filed as above on Mar.1st as I found yesterday when I went up to the County Court House to investigate.

The chemist for the above concern was a man that y u have found to be a trained man in such work namely Mr.Oppenheimer. He was the first man to meet you and lead you into the inner sanctorum of the man Armstrong. As I had both of them together and one was a rabid Scotchman and the other a ~~realize~~ German, it was intersting to see the suddenness that each would with which realize that the other one was talking about his native fatherland. Pete

I had quite a talk with Oppenheimer as I wanted his side to the Am.Pot.

trouble. He said that he sued them on the 1st.of Feb. for back salary amo mounting to $600. andthat he had attached the property at that time. At the same time there was owing to others a sum approaching $700 for back wages On account of a Trust Co. holding title because of a bond issue that was to have been made and that never was, he withdrew his attachment. He still is waiting for his money. Also the AM.POT.Co. is now doing any bu business at the present time. I heard a great deal while in these o fi ces about having a company that would not be started until it was on its feet and that this wouod be soon o acc ount of the great driving power of one man named Armstrong.

Saturaday I spent in trying to get ment that insisted on being out. I had had a letter from J.C.W.Stanley or rather two of them and had found that he was interested in the Columbia Kelp Co. Th s was the same compa ny that W.J.Bell was interested in apparently so I treis to track Mr. Stanley down but could not get him. I did get McAlep though and he gave me the standing of affairs in various concerns in which though he was a l little out of date as too many things had been going on for him to be in touch with them all. He gave me the story of the AM.Pot.Co. about the same as I got it from Gleason so there is nothing to report from him othe than he expected Frederickson of the Koli Syndicate here in a few days and that he would go about with him when he came. He told me of the Trona fight and promised to send me some of the papers.

I got ahold of Gleason on Monday night and got his story of the A.Pot Co. up to date.At the annual meeting the stockholders elected direct ors as fol ows Brander Sladen Harris Tanner Gleason Tanner was made president and Gleason Vice Pres. Tanner had the majority vote and it

the promise of this Board that they would get things started. They first tried to sell $50 stock but failed and then they made a $3.00 per share assesment . No money came in and the ~~ass~~ place was shut down on Feb.1st b the attachment of Openheim. They saw the rocks ahead and so Brander and Sladen and Harris r4signed. Chapman Keyes and Foster were elected in theri places. These men were or are retired business men and have consid erable means. The new Board then levied and a sesment for L.00 and this is is being paid up rather rapidly so that the backwages will be taken care o However they need about $15,000 to go ahead from their figures and so the went out to borrow but had rather poor luck on account of their precarious standing and also tha fact that they were known to be held by a loan of $1800 by a LongBeach Bank. Even the interest had been defaulted on this. Things came to a sh wdown and Tanner and Gleason tendered their resignations but neither were accepted. Then Monday morning of this week Tanner resigne again and his resignation was accepted so that accounted for my being unable to get a hold ogf Gleason during the day on Monday. Gleason was left as the Gen'l Mgr. The condition that then presented itself was that the directors did not control the stock so as they had to go personnally on the notes, they are now circulating a paper that gives them the right of att'n'y for voting the stock under conditions that they are to hold such powers until all notes for which they have stood good are paid off. They are now getting that list. At present the entire is laid off at the plant excep except the boat man and Mr. Proteus who will become the Gen'l foreman and ha dle the engineering and chemical ends. He was the efficiency man that was fired by Tanner and his crowd. Things look de ad as a doornail about the plant and to add to the troubles the slip filled in with silt so that one

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UNITED STATES DEPARTMENT OF AGRICULTURE,
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WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

can only use the channel at high tide. Gleason seemed very optimistic ab about what he hoped to do and gave he usual thirty day assurance about th plant being in working order in that time. As it stands at the present t time Gleason as soon as he gets his proxies will be the wh le show. The men that he has assocated with himself are meh of some means and can go on notes for the corporation. All tye old officers are out now. The daughter of Tanner is the only one that will retain a job.

I also saw the president of the Columbia Kelp Co. Mr. Bell. He stated that they had not decided upon where they were going and when I as asked about the beds at Santa Cruz he halted a bit and so I jabbed him along a bit and asked if Mr. Stanley was working with him. It immediately came o out that they were associated and that they were considering the Monterey Ba as one place for a unit. Aother place was San Diego Bay. He said that his harvester would cut 216 tons of wet elp per hour. Notice that it was 216. That they coued cut and dry for about 40¢ per wet ton. However I did not go over his plans at this time at all but suppose that they are the same as you saw when you talked with him some months ago. He was most affable and stated that he had not asked for a cent up to the present time and that he had the advise of many engineers and chemists as to each ste and that everything seemed ready for the trial . After getting a site, building machinery etc. he empected to get at the game right. He also gave a l ng history of his con ection with the Am/Pot/Co.,

This makes the main things that I found out and they sound more like a dime novel than business facts. I will get over to Loma Portal ina fe days but I heard only a week ago that they had been unable to do anything s since we were there.

Yours truly

W. G. Crandall

Mar.11th 1915.

Mr.Hekan Greenwood,

Berkeley,Cal.

My dear Mr.Greenwood:

Your letter of the 9th is at hand. I will be very glad to give you whatever assistance I can regarding any kelp proposition. As regards the questions asked, I realize that it is according to what is desired as to the value of kelp/ This is brought about because of the mixing of the terms potash,muriate of potash and sulphate of potash. According to the soil determinations these should each be reduced as if it were K20 or potash so that if stated for instance as KCl one should make the proper reduction to get at the unit value in potash. From the results of averages as shown on page 377 Journal of the Franklin Institute Oct.1913 the amount of potash is 2.50% while from the report in Bullein246 Feb 1915 Univ.of Cal. 1.82%. 2.50 pg 60 Bulletin 150 De t.of Agriculture 1915. From the above it would seem that one would be safe on figuring on the average of the two figures at least and I think that more samples have been analyzed for this than by the Univ.of Cal. So assuming either that you wish to,you cna then figure the value at 65¢ per unit. The fertilizer unit is 20# in a ton (2 000). Then there is to be added the value of the Nitrogen if the kelp is dried which is .30% per wet ton @ 2.50 per unit. This would make the wet kelp worth per ton from 2.00 -2.37 per ton.wet. Now if one is going to go on and deal with the salts that are extracted,then this basis would have to be turned to a basis for the purity of the salt that was given off. Pure KCl now brings 18¢ per pound wholesale and so it goes but this is a war price as in normal times it runs from $40.00 to 50.00 per ton.

I weighed a number of cubic feet of kelp in various ways and I found that without pressure it weighed 15# per cu.ft. With pressure that it weighed from 20-25# per cu.ft. When I cut it up fine that it would weigh about 30-33 # per cu. ft. Those who have figured on this seem to agree that in a pile of say 6 ft. depth that the kelp soon weighs 30# to the Cu.ft. I shouod figure however on about 25# as being nearer the correct figure. This figure must vary with the depth of the kelp as the deeper it is the greater the pressure and the more of the spaces between the plants are closed up.

I have no figures on the weight of dry kelp as regards volume. That information might be gotten from the Am.Pot.Co. through Mr.Stewart as they ha have quite a pile of the dried kelp on hand.

I do not think of anything that I can add at the present time to our talk of a few ~~days~~ weeks ago other than to say that only a rotary drier is efficient in drying the kelp. I have recently tried to dry in a stationary furnace and certain mechaincal problems that enter prevent the proper drying efficiently. I shall be pleased to go over yo r wrok and try to give you any points that I can see.

Yours truly,

M. C. Randall

Georgia School of Technology,

Atlanta, Ga. March 13, 1915.

Capt. W. C. Crandall,

La Jolla, Cal.

Dear Sir:-

I am very anxious to get in touch with some manufacturers of potash from kelp, or with some parties who are contemplating the starting of such an industry. Mr. Whitney, of the Bureau of Soils, advises that perhaps you would furnish me with the names of such parties who are operating on the Southern coast of California. I would appreciate very much indeed if you would give me this information.

Thanking you in advance for this favor, I am,

Very truly yours,

H. R. Clarke.

La Jolla Cal. Mar.19th 1915

Dr.Frank K.Cameron,

Washington D.C.

My dear Dr.Cameron:

Last Tuesday afternoon I went over to Roseville and looked atvthe elp roducts Company plant. No onenwas there and so I had to gaze througgh the windows. They have the rotary dryer in place but they have not completed the furnace. They were evidently getting ready to install their Fess Oil burner but the burner was not in p,ace nor was electricity connected up to run it yet. The carrier was arranged a little better than when we saw it but it has n t been connected up yet so as to receive any material from the cutter out on the wharf.

I was over at a bout 4;30 on Tuesday which would have let the tide run in about 3 hrd. and yet there was not enough water off the wharf to float a boat or barge of more than two feet draft.

When is that bulletin going to get out? I want to get certain things o out of it myself now on account of the legislation that is pending.

Mw.E.W.S. is as illusive as ever and I have not been able to get at him yet for a talk since you left. He must have a grouch on about something although I don't know what it can be. He has passed several times and shakes his hand but he don't stop and so far I have beej unable to get a meeting wit him at Miramar.

Best wishes of both Mrs. Crandall and myself to you and Mrs.Cameron, I am

Sincerely yours,

W.C.Crandall

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

March 18, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Calif.

Dear Crandall:

Yours of the 10th is at hand and I have been very much interested in your tale of woe and fairy yarns. You seem to have done a very good piece of work, but I sadly fear that the actual practical result is the record of a lot more warm atmosphere. It is possible that the Perkins crowd may amount to something because Perkins has real money to put into it, but I am not very sanguine that they will get anything definite in the near future. None of the others look to me to have a chance to amount to anything.

Mr. Sellers has been writing long and voluminous letters containing numerous inquiries, but I gather that he went to the Armour people in Chicago under the blissful idea that they, being very large dealers in fertilizers, would be extremely anxious to get hold of the kelp proposition on which he reported somewhat enthusiastically. As a matter of fact, there is not the slightest evidence that any of the large fertilizer manufacturers really want to develop an American source of potash salts or even to obtain any potash salts for the present, and it also happens that people in the Armour Company who would be the most likely to consider Sellers' proposition are much more interested in seeing potash from alunite deposits if there is going to be an American source at all. Sellers, knowing nothing of all this, is naturally very

much puzzled over the reception he has received. I shall probably be in Chicago myself within the next ten days and will look into the potash situation there, and incidentally in New York on my way to Chicago.

The interest in potash has not only maintained, but seems to be growing keener in this part of the world, though, as I said before, this interest is not being displayed by the larger fertilizer companies.

I shall probably have more to write you about this within a few days and certainly I will after several short trips which I am to make within the next fifteen days.

I find that the bag of kelp reached Washington about the same time I did, but the label was lost and apparently about half of the contents of the bag also, and the Property Clerk, not recognizing the material, stowed it away in an obscure corner from which it has just come to light.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

Mar.25th 1915.

Dr.Frank K.Cameron,

Washington D.C.

My dear Dr.Cameron:

I received your personal and official letters yesterday1 Tuesday I went over to see Mr.Scripps and he and I had a good talk about the kelp situation. He said that if we had a proposition that was in black and white regarding all the details of the business,then that he would go over the same and within reason that he would putbup thebdash but that I would have to give him three months leeway to get the money together at the present time as he had just gone into a lighting system that had taken his free cash just now.

The thing that we can do now,it seems to me is to watch the Am.Po Co. and the Kelp Products Co. and see if we can't get one of the plants for a l w price. If they start out and can get a long without going under then we can get an idea as to some running expenses that are quess work now.

E.W. wanted to know what I wanted for experimenting and I tol him that another $1000 might possibly be used in going after some of the detail so I am to have that if we need it. I was thinking that it would be a good plan to put in a small rotary somewhat like the one that the Pacific Product had and then do the various experiments on the dried kelp and work on a method of completing the char at the same time. This experiment I would put up near the Station so that I could work at it and be within touch with the work all of the time. What do you think of it?

I received a letter from Torrentine a few days a go and expect him alon within a day or so. Next week I have to go to Berkeley and see about plans

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FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

March 27, 1915.

Capt. W. C. Crandall,
Scripps' Biological Institute,
La Jolla, California.

Dear Crandall:

I am getting ready this afternoon to leave tonight for the South to be gone a week. I shall go as far as New Orleans and expect to have quite a bit of added dope on potash and other fertilizer problems by the time I get back and as soon as I can get to it will write you on my return. I am sorry E.W.S. is so illusive. I don't think he is acting correctly in this matter. I don't know why he should have a grouch, in fact, the proprieties indicate that the grouch should be on our side if there is to be one. Pretty strong pressure has been brought to bear on me to prepare a perspectus for some New York parties who have suddenly become interested in the kelp and who, I think, would be disposed to push through to the end any matter which they take up. I am expecting to hear from them very shortly; probably will find a letter by the time I get back. Your friend Mr. Sellers of the Roseville crowd seems to be having quite a time of it in Chicago. He has written several letters in and I have, somewhat against my judgment, written him rather explicitly in reply to his numerous questions with the result that he has come back again and again and finally he is asking questions which it would be obviously indiscrete for a government official to answer

categorically and I have had the painful experience of having to tell him so.

I have been working at occasional odd moments on a new statement regarding the commercial utilization of the kelp and hope to put it into definite shape shortly after my return and will send you a copy then.

I am sorry that they are not going ahead with the plant at Roseville as I hoped it would be working shortly and we would get some more experience and data from it. I cannot say that I am surprised, however, and I very much fear that Sellers is going to fall down in his effort to get Chicago capital. I suspect very strongly that he has gone to the wrong people. I am interested in what you say about the depth of the water at the plant and this alone seems to me to be a pretty definite assurance that this particular outfit will never amount to anything.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

April 6, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Calif.

Dear Crandall:

I am returning the bill from the Clarke Machinery & Electrical Co. I have no knowledge of their item of three hours for testing out the crude oil burner. The other items are all correct except that I was under the impression that the valves and nipples were included in the price of the burner. I should certainly be disposed to dispute the charge for testing out the burner according to the first item in the bill. The other matters except for the actual cost of the burner itself could have been handled on my expense account and I suppose I should have insisted upon having this bill before I left San Diego and settling it, but my account has been closed in the Department and, while it is theoretically possible, it is practically not so to have it reopened so that I think it would be wiser to have the bill, less the item for testing, charged to the Scripps fund.

I have just returned from the South and have a miserable cold, but I expect to reply to your personal letter which came while I was away within the next day or two.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

Enclosure.

3207 Nineteenth St. N.W. 4-7-1915

Dear Crandall

The situation here is peculiar. The Chief did not want a report of my work at La Jolla. He opposed me seeing the Secretary or the Assistant Secretary. I politely but firmly pressed the point. Thursday he informed me that he had seen the Secretary and the Assistant Secretary and informed them I had returned and would be at their command if they cared to see me. Yesterday I was informed that the Secretary would be glad to see me some time in the future for which he would set a date when he got around to it. Meanwhile I was informed that your letter to Kettner had been turned over to Mr Lever, who had taken it to Secretary Huston. The latter after holding it 2 weeks sent for me, and expressed annoyance at finding I had already gone to California. It appears very clear that the "Powers that Be" won't move a finger to help.

I have been almost overwhelmed, and have had an avalanche of potash work to attend to. The State Department has been struggling desperately to get the Germans to let some potash salts come through. Some has gotten through but none is coming now. I have had to write letters for the Secretary, ~~both~~ ~~[illegible]~~

Mrs Cameron joins in regards to yourself and Mrs Crandall

I don't see him and have had to go to conferences galore with the State Dept people. These latter annoy the Chief who thinks he ought to be the one consulted, or at the least should have the honor of personally directing me. He, sad to say, is continually being ignored, and wants to take it out on me but cannot think how, or fears to try it. It is all a beastly mess, talky-talk, and nothing being done.

I am very anxious to hear from Mr. Scripps but hesitate to risk "gumming the game" by writing to him before hearing from you. I have others after me but don't want to consider them if Scripps has any idea of doing anything. I hope you will see him as soon as you can and port me. He has a wonderful opportunity.

I found the kelp publication dragging because nobody was pushing it. I stirred things up, saw that proofs, etc, were all hustled to the public printer and am told that it will come out in a very few days now. The mail on potash is very heavy and I will be immensely relieved to have this publication to send instead of long winded letters. Have you seen Burd's bulletin on kelp? It is very weak.

Will write again shortly. Yrs Cameron

Feb. 20 1915

The ask from our last run has not shown up as yet. Hope it has started.

Dear Crandall

I have been thinking over your letter of March 25
It is of course pleasant to learn that E.W. is still interested
And it is of course desirable that you should try out the
rotary kiln scheme. Also it will be a good plan to keep
an eye on the American Pot. Co. and the San Diego Group
But I don't like the situation as a whole. If you are to be
tied up for 10 months and I am to remain in Washington
I don't believe we will ever get anywhere. I am quite
at a loss to see what kind of a proposition E.W. wants
made. Apparently, he wants an absolute "cinch" with no
risks to him. After going over the whole history of the case
it looks to me as if the real trouble is that E.W. does not
want to pay me a salary. It does not make any difference
what his reasons are, it is the fact that counts.
I tried very hard to get Congress to assume the risks and
costs of a demonstration and to all intents and pur-
-poses succeeded. But I was blocked by the Secretary
who thought the problem should be left to private enter-
-prise, and Congress gave me $500 instead of $60 000.
I have no private means. Ergo, When do I fit in?
I have been looking into some new potash schemes. There
is a potash from feldspar plant near Allentown Pa

besides several more on paper, and the as yet unsuccessful one at Curtis Bay Md. And there is a potash from alunite plant under construction near Chicago. But kelp is still the one best bet. It seems to me that there is sufficient evidence that potash from kelp is a commercial proposition and probably a very profitable one. Therefore E.M. could very well afford to go ahead either with a demonstration plant to determine within a year the best methods of production or with a commercial unit to be improved and enlarged as experience and business accumulated.

I can of course draw up a scheme and will be very glad to do so if I can have some more definite premises on which to work. I will be thinking things over until I hear from you again.

I hope Mrs Crandall will enjoy her trip to San Francisco - Mrs Cameron joins me in all possible good wishes.

Sincerely yours

Frank K. Cameron

April 7
9,5

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

Consequently there may be something doing at San Diego But I fear it will come to naught. Last week the Searles Lake proposition blew up. They have dropped Hornsey and all the French crowd have and report that in about 6 months they expect to have another process on trial for extracting the potash. I am on the trail of the new process and see no reason as yet to think it promises any tangible results. Meanwhile the Brandt-Frear crowd are attacking Von der Rapp and the Trona people's titles.

I am very sorry for Brander. But I am not surprised. No one with 2 grains of sense would put any money into the Am. Pot. Co. It all seems to come down to the same thing, that the one reasonable hope of America getting a supply of potash in the near future lies in the hands of E. W. Scripps. If he should definitely quit, I should take steps to stir up someone else. But my own work would be, probably so largely in another direction for some time

to come at least, that I could not push the matter vigorously.

My wife has gotten over the grippe attack from which she was suffering when I returned and is well and cheerful once more. We join in regard to Mrs Crandall as well as yourself and suggest a trip to a reasonably dry country like this. I am very sorry to hear of E.W.'s many troubles and hope they straighten out satisfactorily soon.

Sincerely yours
Frank K Cameron

March 2
1915

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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

La Jolla Cal.
May 1st 1915.

Dr Frank K.Cameron,
Washington,D.C.

My dear Dr.Cameron:

On Monday and Tuesday of last week Apr.26th and 27th, I investigated the affairs of the Pacific Products Co., the American Potash Co., and the Potassium Manufacturing Co.

The Pacific Products Co. have secured a site just north of the Craig Ship yards at Longbeach and are expecting now to go ahead. They have reorganized under the name of "Pacific Products Company of California with a capital stock of $100 000 in 100000 shares at $1. The old company has received for its rights 25 000 shares. They expect to put up their plant and go ahead.

The American Pot.Co. is still going and has cleaned up the materials that were in the plant. They have found that the leak in the potash content was in the crystallizing tanks as Oppenheimer was only crystallizing once and then turning the remainder back into the ocean except for 5000 gals. that were saved. They find now that in three crystallizations that they get out on the basis of eight tons of wet to one of dry a 2½% of potash to the wet ton of kelp. Also in the last crystallization the Proteus the new manager is able through a process that they are for the present keeping secret,to separate the KCl from the NaCl and that the separation is a clean separation. Mr.Gleason was not familiar with all of the details and I did not have the time to go to the plant to see Mr. Proteus who has the process. Finances are still the trouble and

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PHYSICAL AND CHEMICAL INVESTIGATIONS.

unless the creditors are willing to cooperate with the Directors it will be necessary for the company to go into bankruptcy. If proper arrangements can be made then there is a possibility of the plant working shortly. Things look very dark now however and the fact that they have been able to get only 2½% potash means that they must run close to the wind to pull through. If they can get $192 per ton for the ~~dried kelp~~ KCl then they can see their way clear and they are now corresponding to see whether the market is at that price or a lower figure. This may determine the future of the plant. They sold some 15 tons at $13.50 some very fine dried kelp that they had to a fertilizer company in Los Angeles. For the present this seems to be the price that can be obtained for the dried kelp. This is at variance with the price that Hannigan claims that he can get of $32 per ton.

The Potassium Man.Co. is still in its office in the Story Bldg Last Tuesday they went to El Secundo to commence the building of their plant. They would not show their plans nor devulge their plans but they expect to get out a folder in a short time that will show how much they know or rather a few things that they know as they do not expect to devuldge all they know for the public. They say that their plant will be running in 60 days etc. They started and built a fence around a place at Wilmington but that was all that they did and now they are moving to El Secundo. They did not tell me anything about the first plant but I got onto this from others who broke in to find out what was up. Nothing seemed to be up. At present Armstrong is complaining about the Blue Sky law as he has to tell about

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PHYSICAL AND CHEMICAL INVESTIGATIONS.

his plant and plans and then he claims that they let the knowledge out so that ti gives away his process. This seems to put him up against it as I suspicion it should. Armstrong still knows more about the game than anyone else and will be the only man in the field according to his statements. When the folder comes out you may expect to hear wonderful things.

For the last three days there has been the hardest storm that I have seen in these parts in the last ten years and it has played havoc with the kelp beds about here. I have not heard how it affected the beds north of here. Tons of kelp have been cast up here but until the water gets a little more quiet, I can't tell anything about the beds themselves.

Hannigan and Blankenberg have not begun to run yet and seem to be troubled with the usual lack of funds.

Yours truly

W. C. Crandall

COPY.

May 7, 1915.

Dr. Milton Whitney, Chief,
Bureau of Soils, U. S. D. A.,
Washington, D. C.

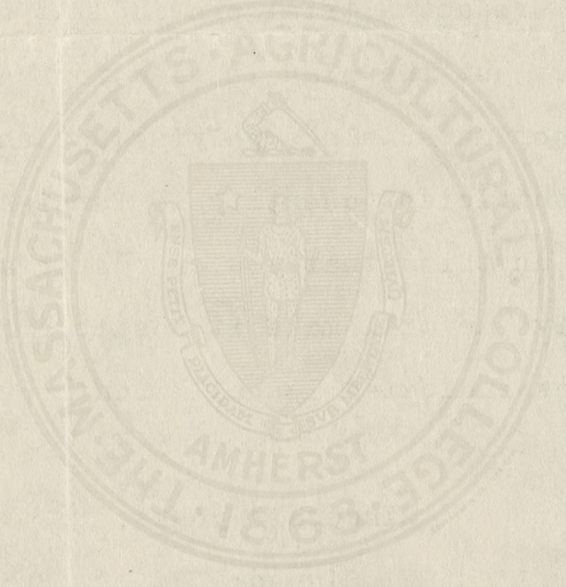
Dear Sir:

I write to ask whether it will be possible for this Experiment Station to obtain in sufficient quantity for a series of field experiments a supply of any potash product or any preparation of kelp free from nitrogen known to be rich in potash? We should be much interested in giving any such product a trial provided it can be obtained. In order to carry out the plan in view for comparing this product with other materials supplying potash we should need the product in sufficient quantity to furnish 20 pounds of actual K_2O. If anything that you can do or any information which you can give me will make it possible for us to obtain a kelp product as indicated I shall much appreciate your assistance.

Sincerely yours,

Signed: Wm. P. Brooks,

Director.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FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

May 8, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Captain:

Your letter of May 1 is at hand and I am very much interested in your report of conditions around Los Angeles. Turrentine has written me that there is a firm producing dried kelp near Anacortes, Wash., using waste wood from the lumber mills as fuel but carefully avoided mentioning who the firm was, how much they were producing, or what they were doing with the product, and as he is moving around the country somewhat rapidly and irregularly I have not succeeded as yet in getting a more definite statement concerning the matter from him.

There is some talk in New York of a combination or company being formed there to take up the production of potassium chloride from kelp on the California coast and in such preliminary talk as I have heard it was assumed that I would be an integral part of the organization. As far as I know, however, the matter is purely talk and I have heard nothing further about it in the last few weeks.

A more interesting and perhaps a much more promising development has come forward in the last few days. A number of the manufacturers of fertilizers who are not directly connected with the big importers of potash are considering the desirability of forming a combination of some fifteen or twenty firms, subscribing enough money to establish a kelp plant on the California coast with the idea of providing material to

keep their usual guarantees of potash in the fall sales. To do this they understand that they will have to work very quickly and they seem to be quite as active as the occasion demands. I have consulted very freely with several of the gentlemen interested within the last ten days and this morning had a long talk over the long distance telephone from which it appears that they propose to have a committee of the gentlemen interested proceed to the Coast very shortly with an idea of making a personal investigation and to report to the rest of those interested, and they desire to know whether or not the Secretary would authorize me to accompany the committee on its trip of inspection. The Secretary is away and I do not know yet how the Acting Secretary will feel towards the proposition. I was informed that he would confer with me today concerning this and one or two other matters and have held myself in waiting but have not yet been summoned to his office so that I cannot inform you any more definitely as to the prospects of my soon being in your neighborhood again or the prospects of seeing you and Mrs. Crandall in person shortly.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

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WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

May 8, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Calif.

Dear Captain:

I have just written you an official letter in which I have called to your attention the possibility of my going to the Coast again soon on a trip of inspection with some fertilizer manufacturers who are considering the kelp. This proposition looks serious to me and that the chances are distinctly in favor of their going into the business. It also is my personal feeling that it is a darn shame that you and I don't profit by the kelp after the agony we have been through and that it might be worth your while to see M.E.W. again and see whether or not he wants to do something definite. Not having heard from you further regarding his proposition I have not attempted to prepare any formal statement to lay before him. I do not see how I can until you give me a clear idea of what is in his mind. It looks now as if I would be away from Washington for three or four days next week but I will be back undoubtedly by the end of the week and if anything further has developed along kelp lines will write you.

Sincerely yours,

FRANK K. CAMERON.

May 9th 1915.

Dr. Frank K. Cameron,

Washington D.C.

My dear Dr. Cameron:

Friday of this week I was in Los Angeles and went down to Longbeadh in fact I went down on Thrusday but found that every one was busy in trying to make some kind of a business deal that is on and so I didn't get to see anyone but I went back again the next morning to stay a few minutrs as I supposed but instead I stayed for some hours so that I missed the 3 o'clock down to San Diego in the afternoon. I was getting a lot of stuff from Protus that was intersting to me and I think may be intersting to the department. This is tather s story of German intrigue than it is of developement of the kelp industry.

From my talk it develpood that Oppenheim is playing a double game and that it is abot time that he is being looked after with a good deal of care. Just before the war started ,about three days there was a young German showed up at the plant of the Am. Pot. Co. and was with Oppenheim all of the day and they were in comsultation about the plant all of the time and there was one of the mne who could understand german and he heard Oppenheim tell this man all of the secrets and opperations of the company and during this he was refering to the little book that he carried in h s pocket. In tis he told some th ngs that wee not known to the com any and also told about the workings of all of the other companies th t arevor were starting to work on the coast. From the incidental talk that the man heard he was sure that Oppenheim was telling all about the work. After the man had gone this man told Oppenheim that he was telling about the work that was not supposed to be given out. Oppenheim was white and mad all through and said that he got more out of thebmna

more than he was told. He seemed much put out when he discovered that he was understood. Then the work went on and it seems that Oppenheim said to various men of the place that he was not telling the company all that he was getting from the place and that he was holding something back. The Protus went on the job and as officiency endineer and he was not accorde anything like a square deal but found that he was being given bum steers all over the work. In fact Op enheim told him that he would not tell him about the work so that he might make a satisfactory examination. The upshot of it was that when Protus was called on for a report he said that he couod not as he had been unable to make a proper investigation. However he thought that they c uld not turn out more than a thousand ounds of potash with th plant. This occured in Jan. and O penheim was called up for a re port and he made a report that he could turn out 5 tons per day with the plant. This is in a signed statement. Then they called on him to make a test run to see why they were not getting the potash. The result was that he refused after they had called his bluff an which he claimed that he did not have furnace room enough and when they showed him that there was a lot of char over and above that amount that he was using in the evaporating plant, he flew into ar rage. The when they insisted on the test run he quit. Just befre this S les and Howard had taken some of the water that Oppenheim had or dered wasted in the ocean, and sto ed it in a tank that was supposedly built for a water tank and they saved about 5000 gals. After Oppenheim had gone they warked this through the plant and got about 60% of the a parently l st potash that they had not been getting from the evapotation. Also the cahr was found to contain a large amount that had n t been leached out and so t went. In fact it seemed as though Oppenheim was deliberately trying to let the potash content het away. Just before Oppenheim left he flew into a rage because he had lost the little private notebook and it was never found. This I understand was

who is now somewhere in San Diego. So far I have not found him. He is supposed to have the book with him. It seems that probably this book contains the information of the insude workings that were not turned into the company.

Also about this time a woman entered into the game who it seems is a member of the same esionage society that Oppenheim is and that she has a pin that identifies her with some sort of similar society. All of the above things seems to tend to show that htere is something behind the whole proposition that may put all of the work done as that of the people with whom Oppenhei is associated in the class of trying to stifile the kelp industry. Another thing that occured that may be signicant is the fact that Oppenheim was always complaining that he was broke as the company was not paying him and one day when he said that he was broke and didn't know where the next meal was coming from that Protus offered to to pay his fare when they went up on the car. At the time Oppenheim was getting out his pocketbook and then that as he opened in that three ten dollars gold pieces appeared and that he hurriedly closed that side of the book and opened the other side and then found a nickel on the other side. This bears out the fact that he woman refered to suggested that he was being paid for work by outside parties.

Also he was further asked one day about his lunch that he was so poor that he probably not carrying lunch. To this he responded that he always had a good lunch and then told of the lunch that his wife put up and htat this lunch was an excellent one. As followed up then he did not seem to be as poor as he let on that he was. What bearing this may have Ibwill have to let you judge but it would seem to me that there is enough hearsay to show that for some reason there is reason to look this man up and also some of the ment that he is associated with as for instances the Braun people saythat he is an excellent analytical chemist and they vouch for his work. If there is some fire somewhere it ought to be traced

down.

Now as to the work Protus has t rned out quite a quantity of potash and this he has done by repeated evaporations. There are now showing in the plantsome fifty or sixty 200# sacks of KCl and some five or six sacks of K2SO4 and abo t the same of NaCl. The se he is separating so that he claims that they are about pure. He did not give me the methdd of separation and I did not press him as I thought that I had better work hima little slow and get that the next time if I could. He is trying to eep this quiet and whether itbis a bluff or not I can't say. As the plant was not working I could not get around him and see what was going on to get the method out. He claims that from the wet kelp that he can get only about 2½% KCl insted of 3½-4%. He finds that the KCl begi s to volitalize at about 700° C and that at 1200-1400 about 16% is volitalized They start their rotary at more than 1400 so that there may be considerable loss in that way. He figure 7.7 tons of wet to the dry ton of chhr. In testing out methods he finds that the Stanford methos of charing saves a considerable more of the KCl than does the method that Oppenheim installed. That the char as leached out now contains a considerable quanyity of the slats. That he can get now about 2½% from the wet kelp. Als his figures agree with my estimates on the amount of kelp thatwas being brought in last winter. The total figure given was 700 tons and he figures that it was from 450-500 tons. As I measured up their boat I think that this more nearly appoaches their amount harvested. The things that my talk ith Protus suggested were that we ought to experiment at the present time upon the volitalization point and the catching of this in the rotary stack, also from the buring to char as to the best type of furnace and then in the filter press so as to get all of the salts out. More than 2½% ou ht to be gotten out. If you will outline some experiments along this line, I think that I can get the money to put pver some experiments that may show up these points. I have in mind at

present these oints as being worth especial attention.

From what I can gatherArmstrong is going to use the methods used in Scotland to put across his kelp plant. Also he figures on using a floating dock at EL Secundo. Oppenheim is now with him.

We just had a terrific strom here and I am getting back to normal again. I was just g ing to go out on a trip and the strom broke and another boat g t adrift and played a little havoc with th stern of my boat sp that I was out of commission for a few days but I do expect to get out in a few days now and then I shall go overthe local beds and see how they are getting along. This has been a hard winter and the ocean has been on the rampage for some weeks.

Next week I start the work on the oier and that will keep me rather bs busy for some five months.

With rega rds to you and Mrs. Camer n and Turp, I am

Yours sincerely,

W C Bardach

Massachusetts Agricultural College

AGRICULTURAL EXPERIMENT STATION

OFFICE OF THE DIRECTOR

WM. P. BROOKS, DIRECTOR

AMHERST

May 13, 1915.

Capt. W. C. Crandall,
Scripps' Biological Inst.,
La Jolla, Calif.

Dear Sir:

Professor Frank K. Cameron, of the Bureau of Soils, Department of Agriculture, Washington, suggests that I apply to you for a sufficient quantity of kelp ash to supply not less that twenty pounds of actual potassium oxide. I quote the paragraph from his letter in which he makes this suggestion and I am sending, also, a copy of my earlier letter to him:

"If none of these suggestions appeals to you, Capt. W. C. Crandall, Business Manager of the Scripps' Biological Institute at La Jolla, Cal., and also a cooperator in the work on the staff of this office, is also representing our interests locally in the kelp investigations, and I am sure that he would be very glad to prepare enough kelp ash to represent twenty or twenty-five pounds of potash and forward it to you if you would address him directly and mention the fact that the suggestion came from this office."

I am sending to you rather than to the other parties that Professor Cameron mentions in his letter because it appeared quite uncertain whether either of them would be able to supply what I needed. If you can do so you will confer a very great favor if you will ship the material by fast freight at as early a date as possible.

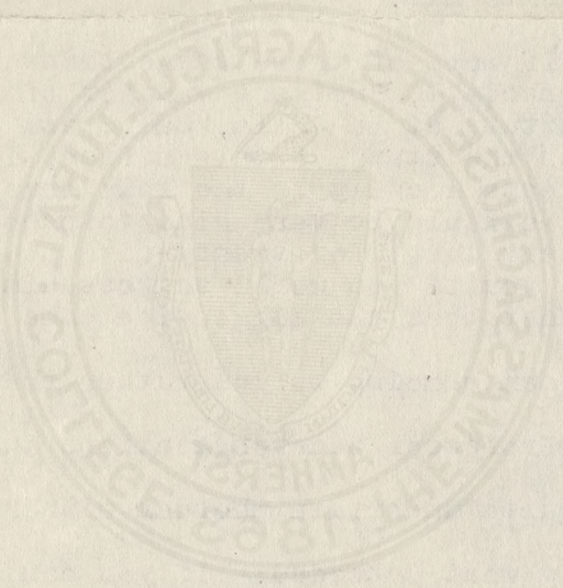
This Experiment Station will meet such charges as may be necessary.

Sincerely yours,

Wm. P. Brooks

WPB/G

Director.



THE MARK PROCESS DRYER COMPANY
GENERAL OFFICES. FISHER BUILDING
CHICAGO. ILL.

PROFFESSOR W.C.CRANDALL,

LA JOLLA, CALIF.

DEAR SIR:-

PROFFESSOR J.W.TUTRENTINE SAID "WRITE PROFFESSOR W.C. CRANDALL, AND SEE IF HE CAN SECURE YOU THE DESIRED KELP, AND USE MY NAME"

PROFFESSOR TURRENTINE HAS CALLED ON US IN RELATION TO THE DRYING OF MATERIALS, AND AFTER LOOKING OVER OUR PROCESS, HE ADVISED WRITING YOU TO ACCERTAIN IF YOJ COULD SECURE US A BARREL OF THE KELP AS NEAR ITS NATURAL STATE AS COULD BE, AND SHIP TO US FOR TESTING OUT, IN OUR DEMONSTRATING PLANT.

SHOULD YOU CONSENT TO SENDING US THE MATERIAL, IT SHOULD BE PUT IN A TIGHT CASK, SO THAT WE WOULD RECEIVE IT INTACT FOR USE. WE SHALL BE PLEASED TO RETURN YOU FINISHED SAMPLES OF THE PRODUCT, THAT YOU MAY BE IN A POSITION TO KNOW THE RESULTS.

SHOULD YOU COMPLY WITH OUR REQUEST, WE SHALL BE PLEASED TO PAY ALL EXPENSES.

MAY, 15TH., 1915.

VERY TRULY.

THE MARK PROCESS DRYER COMPANY.

C.W.Mark.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

PERSONAL:=

May 19, 1915.

Capt. W. C. Crandall,
Scripps' Biological Institute,
La Jolla, Calif.

Dear Captain

In an official letter which I have just dictated to you I have stated that it is possible, and I will say now that it is even probable that I will find it necessary and desirable to go to the Coast again within the next few weeks, probably in company with a committee of the independent manufacturers of fertilizers. These gentlemen wish to keep their operations very quiet, at least for the present. They are also very anxious that I should go with them as obviously I could greatly lessen their labors in the time necessary to make their investigations. Their idea at present seems to be to get a group together to put up the money for a plant of sufficient size to turn out kelp ash or potassium chloride which ever it is decided to be best for the needs of the factories of these individuals, the sum of money to be so distributed among them that the risk is very small and one easily assumed by each and every individual. There seems to be a general assumption that in some way or other I am to be interested in the venture financially, though nothing definite has been said to me at least in this connection beyond a statement by several of the men prominent in the organization that it is understood that I am to be well taken care of.

Now it seems to me that it would be altogether better for you and me both to start the kelp business along the general lines that we discussed

just before I left you in February if Mr. Scripps wants to do it. I do not think it is worth while to spend a few hundred or even a thousand dollars in preliminary experiments. The thing ought to be taken up in a serious way with the intention of putting up a plant as quickly as possible and only doing such experimental work as may be necessary to settle on the details of the plant. The extraction of the salts from the ash is a comparatively simple problem involving no technical propositions which are not thoroughly understood and practiced in a number of existing plants. I do not regard the problems of harvesting as anything serious, although we have no very satisfactory evidence as regards cost. This will obviously vary somewhat owing to time and place but we know enough about it to know that the cost is not high. The one point on which we are not very clear as to probable cost is the drying and incinerating. It might be worth while to use a part of the thousand dollars which you think you will have available to rent either the dryer of Lannigan or that of the American Potash Company for a week or ten days run and to provide sufficient kelp for the said run. Of course your friend Proteus is right about there being some volatilization of potassium chloride at 1400° if 1400° is ever actually realized in the dryer at Long Beach, as I personally do not believe and as I think I remarked to you the day we were there and saw the dryers working. I had seen dryers and kilns of the same general type at work before and have seen a number since and am able to estimate with a fair degree of accuracy the temperatures involved. Potassium chloride of course would volatilize below 900° but that would be a comparatively small matter if the discharging end of the dryer were considerably below that tempera-

ture, which undoubtedly it would be.

Up to the present I have not had a word from Mr. Scripps and confess that I am somewhat amazed and am in very serious doubt as to whether he really intends or has ever intended to take the matter seriously. However, you know the gentleman better and are the best judge and if you think it worth while to approach him on the matter at all I should consider it wise to seem him at once and find out whether he is still desirous of going ahead, and if he is not, the sooner we know that fact the better we can make arrangments in other directions.

With kindest regards to Mrs. Crandall, in which Mrs. Cameron joins me.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

May 19, 1915.

Capt. W. C. Crandall,
Scripps' Biological Institute,
La Jolla, Calif.

Dear Capt:

I am very much interested in your long letter of May 9, which arrived while I was out of town on a trip to inspect processes for extracting potassium sulphate from alunite. There seems to be considerable promise in the alunite proposition, but of that I will write you later.

No one would ever have suspected, to look at Oppenheim, that he is such a sly dog. I cannot get over the feeling myself that he is merely stupid. Perhaps he is a good analyst, as the Braun people think, but he is very far from being a capable chemist. I did not wish to be too strong in my statements regarding him when I was on the Coast, but very frankly his procedure at Long Beach was distinctly stupid. Leaching and extraction processes are so common and so well known and the technique has been so highly developed in numerous factories, both in the United States and abroad, that any real chemist should have no trouble in handling so simple a case as is presented by the kelp ash, and Oppenheim's performances would excite derision. I took up your letter with the Chief of the Bureau but it is his judgment that we would not be justified in referring the matter to the legal officers as it is clear that the evidence is entirely hearsay and it does not appear that Oppenheim has actually done anything to

injure the public interest or is in a position to do so. I am sure in my own mind that he cannot harm the American Potash Company by anything he learned there for they have not and have never had any secrets that were worth anybody's trouble to find out. I am very much interested in your report of Proteous' discription of the present situation and it agrees quite well with the report of Mr. Barndt which he has recently prepared for his friends in San Francisco and New York, a copy of which he has just sent me. Barndt is in the East at the present time and I rather expect to see him within the next week or ten days from a note which he sent along with the memorandum.

A number of the so-called independent manufacturers of mixed fertilizers appear to be getting together for the purpose of working out some organization to prepare potash from kelp for their individual fall trades. They are proposing to send a committee within the next few weeks to the Coast to look into the situation on the ground and the Acting Secretary of Agriculture has authorized me to go with them at their request, so that it seems possible at least and perhaps probable that I will be on the Coast again within a few weeks. If matters really develop in that direction I will let you know promptly.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

May 23rd 1914.

Dr. Frank K. Cameron,

Washington, D.C.

My dear Dr. Cameron:

Enclosed find a couple of bills that have b een laying around for some time. Whenever I would think to take the little book with me I could never find the men that did the work for me, likewise when I found t the men, I never had the book handy. Of course I don't have occassion to carry it around with me except upon very special occasions.

Last week I ordered Jim to send you two samples that I took off from Station #1 Sen. Doc. #190 and I anticipate that he has done so ere this. One ~~te~~ was to be a dried sample and thebother one to be a wet sa sample.

I was up about the beaches last weeklooking over piers for the Station and had expected to get a little time to go over to Longbeach and see how our friends were getting along there but was unavoidably detained. However I have heard that the American Potash Co. now has a conveyor and an enclosed drier and they report continuous work. I am in doubt about it however as Brander promised that he would let me know when they d d this and then he and I would go down and watch the j b for a complete run. I have not heard a word from him and so suspect that they are not running yet at least continuously.

I saw Bernstein this morning and he tells me that the Pac. Kelp Mulch Co. has gotten ahold of a little money and that they will soon be putting dried pulverized kelp on the market.

I shall probably go up about the 14th and see for myself what is going on in the work even if I do not hear from Brander.

Yours truly W. C. Crandall

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

65 Park avenue, NEW YORK.
May 25, 1915.

Prof. W. C. Crandall,
La Jolla, Calif.

Dear Crandall:

I have been a long time getting to this, As you can see from the above, I have made considerable progress since the very pleasant Sunday spent with you at La Jolla. The end of this week will see me in Washington, and between you and me, I shall be mighty glad to get back.

While in San Francisco I was informed that the Standard Fertilizer Company, 321 North Los Angeles Street, Los Angeles, was advertising Kelp Fertilizer for sale. It might be of interest to find out the source of the Kelp which this concern proposes to put on the market. In Seattle I interviewed Mr. J. H. Scott, an acquaintance of mine of two years ago, who has kept himself in the public eye in connection with the Cannery Waste proposition on Puget Sound and Alaska. During the winter he electrified the Potash market by announcing to a New York Times reporter that he had just sold 10,000 tons of Potash from kelp, and was in a position to take orders for more. When cornered he admitted that he was selling short. In other words, that the Potash that he was selling was still in the Kelp. He claims, however, that he is about to make good, that he has taken over the Pacific Kelp Mulch Co. of Long Beach, and that he is about to install two rotary kilns. With his Superintendent,

Mr. Christofesson, he was about to start for California to begin operations. It might be well for you to keep an eye open for Mr. Scott, and let us know what he is doing. In the North, especially in Alaska, he has a reputation which it would hardly do for us to discuss in a letter of this kind.

With best regards to you and Mrs. Crandall, I beg to remain,

Yours very truly,

J W Turrentine

THE MARK PROCESS DRYER COMPANY

GENERAL OFFICES. FISHER BUILDING

CHICAGO. ILL.

W. C. CRANDALL,

LA JOLLA, CALIF.

DEAR SIR:-

YOURS RELATIVE TO KELP, AND IN REPLY. SINCE WRITING YOU, WE HAVE RECEIVED AN OFFER, AND HAVE ORDERED A CASK OF KELP FROM LONG BEACH, CALIF, AND IT WILL BE ALL WE REQUIRE.

WE THANK YOU FOR THE OFFER, AND WILL GIVE YOU SAMPLES, AND DE-TERMININATIONS, AS FREELY AS THOUGH WE HAD RECEIVED THE KELP FROM YOU, BUT DO NOT DESIRE TO PAY FREIGHT ON BOTH LOTS.

MAY, 27TH., 1915. SINCERELY, WITH MANY THANKS.

C. B. Mark.

June 16th 1915.

Dr.Frank K.Cameron,

Washington D.C.

My dear Dr.Cameron:

On account of the stress of work,I have been unable to write to you for some time. However I have kept track of the movement of things in so far as I have been able to at a distance. Tomorrow I am going over to Point Loma and see the Kelp Products people and next week I hope to be able to get away for a couple of days and go to Los Angeles and go over the ground there. No one has been around for some time with kelp troubles so I have got to hunt them up. I was over to Point Loma the other day and nothing was doing at that time.

There is an opportunity here thoughnfor experimental work that ought not ot be missed in that the beds from here to San Diego were greatly reduced in size and thickness during the last winters rains and storms. Now will be a great chance during the next few months to study the kelp beds and their regeneratinn. For that work I am going to have Ross go over the beds and hekp me in getting data together. Also I have bought a small gasoline boat that I can go out from the Station in and watch the beds at first hand and also have one of my men help at who will have a lot of work to do on the beds in getting materials for the Statioh. It will mean additional work for him but as he is a good man it will be money well spent to have him do the work in addition to his regular work. I don't know what you are going to allow for wo4k next year or whether you are going to allow any or not btt I believe that this will be as good a piece of work as you could have done if something can be allowed for the work. The study of the growth is still an open one and conditions are now most favorable for that work. If these beds regenerate we can get exact figures on the time,kind etc.

I still have a little money left for experimental work on this line but not enough to carry it through and if the Department will help out, I think that i it will be worth the while. I am interested to see the beds areound L.A. to see whether they show this same deterioration. If they do it may account for a great deal that we encountered on the survey in that beds were absent that the people locally said had been there previously. To me it is one of the most important things that I have bumped into.

I have not received the kelp reports but I went in and saw Kettner the other day and got a few copies from him. My supply must have gone astray somewhere along the line. If things limber up again, I shall need all of them to take care of the poeple that will be interested in the work.

I hope that you will be out in this neck of the woods again soon and tha I may see you and go over the diffe ent phases of the work again.

Will porbably send in a complete report on all conditions in about 10 days.

At pr sent I am putting in a 1000 foot pier, building three houses, taking care of the summer colony and getting a course ready for teachers for next year so that I am working day and night of the various thing that are doing. Come out though and I will run you around this neck of the woods in my new Dodge car. It is a hummer and I am covering a g od many hundred miles per week at the present time so come and help me out.

By the way yo might suggest to Rice sometime that he gets the use of a car etc for all local work and that there is no charge for this though it does cost me something for tires and gasoline and that I am not going to worry even if he don't want to recognize acc ounts when I have to lose time in order to see people for the Department. Nix cum herause anyhow.

With best regards to you and the wife, I am

1913.

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June 25th 1915.

The Mark Process Dryer Co.,

Chicago, Ill.

Dear Sirs:

Your favor of the 21st inst is at hand also the samples of the dried kelp which I am forwarding to the Dept. for examination. Whatever general literature that you have on your dryer, I should be glad to have as the samples that you have sent out seem to be in fine condition. Until I have some idea as to the method that you use, I would be at a loss to ask intelligent questions concerning the product but usually I ask concerning the appearance of potash at the flue or stack end of a plant. Also tests for iodine vapors at same point. What is the capacity of a unit of your plant. What do you use as fuel and what is the fuel efficiency in your run. In other words we are anxious to get at cost values for labor, machinery and fuel as these are some of the determining factors that will determine the future of the kelp industry.

Yours truly,

G. Colcord

La Jolla Cal.,

June 25th 1915.

Dr.Frank K.Cameron,

Washington,D C.

My dear Dr.Cameron:

I am forwarding a letter that I received also the samples that were received soon after. Th s was done in connection with a request that reached me some months ago from theMark Dryer Co.

I am ready to turnin a big report but am too rushed to do it today. Let me know whether out of the appropriation that I get I can hire another man to do the work of observation along the linss that I wrote to y u about a few days ago or not. Also I really haven't heard whether you will want me to continue the work tat I have done the last year or not and I believe that the time is up on the 1st of July.

I did three days in and about Los Angeles and got back last night. Thanks it was hot as the devil and I am in no pleasant mood today as a result with work stacked knee deep on all s ides.

Yours sincerdy,

W. W. Garner

June 25th 1915.

Bureau of Soils,

Washington, D.C.

Sirs:

E

THE MARK PROCESS DRYER COMPANY

GENERAL OFFICES. FISHER BUILDING

CHICAGO. ILL.

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June 26th., 1915.

Mark Process Dryer Co.,
Chicago, Ill.

Mr. C.E.Mark, Mgr.

Dear Sir:-

Your samples of Dried Kelp, from the material I sent you June 1st at hand, and must say am greatly pleased with the results.

In practice, we find a 36 hour delay, from fresh material to drying - some what problematical - at least difficult, with varying results. When one considers the length of time elapsing from the fresh material to drying, in your case about 400 hours, - practically 11 times longer than we consider advisable, I am surprised at the product shown in the samples.

It may be of interest to know that I reserved a portion of the Kelp sent you - and dried it after a lapse of 300 hours, by our present method, and must say your samples of dried kelp are far superior to one in question.

Judging from samples received, I do not hesitate to say that I believe your process the one par excellence for drying kelp.

Kindly quote us price on 300 ton green kelp per 24 hours, ready to operate - fob here.

Very truly,

********* ********* ******

*** / * *** * ********** Supt.,

T. M. P. D. CO. No.

The Scripps Institution for Biological Research.
of the
University of California.

June 26th., 1915.

The Mark Process Dryer Co.,
Chicago, Ill.

Dear Sirs:-

Your favor of the 21st is at hand, also the samples of the dried kelp which I am forwarding to the Dept. for examination. Whatever general literature that you have on your dryer, I should be glad to have as the samples that you have sent out seem to be in fine condition. ******* usually I ask concerning the appearance of potash at the flue or stack end of a plant. Also tests for iodine vapors at same point. What is the capacity of a unit of your plant.*******

Yours sincerely,

* * *********

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

June 28, 1915.

Capt. W. C. Crandall,
Scripps' Biological Institute,
La Jolla, Calif.

Dear Crandall:

I have been thinking over your letter of June 16 and am considerably puzzled as to the conduct of our work on kelp in the future because I am unable to find out just what the Secretary of Agriculture's mind is on the subject. It is clear that he objects to my going to the Coast if the purpose of the visit is to push the commercial development of the kelp by contact with manufacturers as I have been informed that he considers it the proper procedure for the manufacturers to consult me at my office in Washington, and if they desire assistance outside of the office they should secure it outside of the Department. At the same time I have a very decided feeling that we should continue our investigations and observations, especially on the growth of the kelp, and as this does not seem in any way to run counter to the Secretary's wishes of avoiding direct contact with manufacturers I am requesting that your honorarium be increased to $300 for the coming year to justify you in continuing the work, and the added trouble of making the observations. As to the expenditure of $1,000, of which you have written heretofore, on experimental work, I am quite at a loss to see how this can be advantageously used. We know that kelp can be dried; we know that dried kelp can be burned. To put up an adequate demonstration that the drying and burning can be best conducted at the one operation would require considerable

over $1,000. Possibly the best use would be to rent either the Long Beach plant or the Rosedale plant and make some runs, keeping a strict account of ingo and output so as to have some direct figures on which to make estimates. I should hardly feel justified in using any government funds for this purpose, however, in view of the Secretary's expressed attitude and it will be necessary to finance the experiments entirely by Scripps or some other outside party.

I am unable to understand why the kelp reports have not reached you, but I am stirring it up again at this end and insisting that a duplicate set be sent you.

At this end of the line the interest in the kelp seems to be increasing as far as our people outside of the Department is concerned. I would like very much indeed to be able to help break in the new Dodge car, but it does not look probable that I will have that pleasure. Mrs. Cameron joins me in regards to you and Mrs. Crandall.

Scincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

June 28th 1915.

Dr.Frank K.Cameron,

Washington D.C.

My dear Dr.Cameron:

Last Tuesday morning I got away for Los Angeles and went over the kelp situation which I found to be as follows:

I sawthe following companies: Potassium Manufacturing Company,American Potash Company, Pacific Products Company, The Coast Production Company and interviewed Mr.Gleason,Mr.Porteous, Mr.Bernstein, Mr.Armstrong, Mr. Oppenheim and others.

First Potassium Manufacturing Company have secured a plant at El Secundo and have just received word that they may issue100 000 shares at 50¢ and latte they are assured that they may issue 20 000 more at the same rate making 120 000 shares at 50¢ per share. With this stock which is still to be sold they expect to erect a plant that is illustrated inthe accompanying they expect to go ahead but Armstrong has last some of his bravado and is now more conservative in his claims as to when they will start and what they will do. It seems that they were unable to interest capital unless the capital got the best of the proposition and so they are now looking for the small investor who will not be so particular. I asked as to their method of financing as they are incorporated for 500 000 shares and Bernstein told me that they, Armstrong and hi self were working without pay but that they were to sell the 120 000 shares of stock and then that he and Armstrong were to have an option on the remaining 380 000 share at the par value of the stock. That is they could then sell the remaining stockb at whatever price they could get for it and if the stock went up they would get all the advance. If their stock goes up they stand to make a nice promotion sum and if it don't then

theyvare out. In some ways it is beter than the usual promotion and in other ways it is the biggest graft that I have ever seen. If the company fails then they are out all their time and energy but f it wins they get all the cream amounting to 380 000 shares which they can manipulate as they please. Its the best allingford scheme that I have seen in a long time. They are now figuring with a Chicago firm about a trolley line or tramway from a pier that is to be o t in the ocean. From the enclosed drawing you will see that they have to passover the Pac.Elect line and as I figure for sag etc. they may finds some trouble in doing it. They expect to get the pier in about as I thought a pier might be put down down near Bird Rock. It is the same principle. Arm strong told me that they had 580piles for the work down there so I went to see as I felt that ought to be from Missouri. They had some piles to be sure but they were short and were the piles that had been dragged up after the winters strom that tore away some 800 feet of the Standard Oil pier that I have pencild in approximately. There is piling scattered all along the c ast for miles and they have some of that dragged up b t then only about 50 15-16 ft.lengths. The grading in the sand is done that I think that I can do in a days time with a go d fresno and team. There is no fence or office building as yet and nothig but talk has really developed but they expect to go to it in about two months. They will use a Scottish patent to do their work. I forgot about the collecting. I learned at Long Beach th t they had contractedbfor two of t e cutters that the Am.Pot. Co., use but Armstrong spoke in his usual bravado terms that they were not worrying about landing against their pier as they had something up their sleeve as to a way of handling kelp that would not involve any barge and then he smiled in a knowing way at Bernstein . However they are looking after the method th t has been tried out so I take it as some more of his bluff.

Pacific Products Company have moved to Long Beach and have erected an& office building just North of the Craig Ship Yards. There was one lone man in sight leveling a place ff for the approach for some kind of a pier. He o told me that they were up against the Bond Commission and that for two months

the had been getting their permit to go ahead and sell stock. All the prin ciple man were is Los Angeles and I was unable to get ahold of them . They are trying to get ahold of the work and go ahead but I can say nothing concern-ing what they have done except as I reported in my last letter.

The American Potash Co. is working at getting the San Francisco people interested and they have until the 29th of the month when there will be a stockholders meeting to ta e up an offer if it is made and if nothing is done then Gleason is going to pull out and that will mean that the company will have to go into the bankruptcy courts. Gleason calls it his $8000 Doc 190 experi ence. He can see that there is money in it but that their overhead expense is what is holding them down at the present time. He is sure that Proteous ha has found the system whereby the potash and salt can be separated but that they will be unable t go ahead unless they can make this deal in the North. So I ought to hear from him in a day or so. I tried to get a deal on with him so as to see if we could not rent his plant for a few days so as to get data for harvesting and drying data but he suggests too great an outlay to be considered at this time. The scheme that Porteous proposes is to have a pan for evapo-rating and then above the evaporating surface to have a drip pan and that the slat crystals will collect in this and so separate the mother liquor from the salt and then that the potassium salts may then be separated practically pure from the m ther liquor. Gleason told me this and that is what I gained from his talk.

Back of the Am.Pot .Co. is another plant that has just been established with a rotary drier very much like the Am Pot.rotary altho smaller,it being about 4 feet in diameter and capable of about 40-50 tons per day theoretically This plant is the " The Coast Products Company and is one that a Mr.Prevett of the "Los Angeles Canning Tunny " company has started. Tye plant is up and an arrangement has been made with the Am Pot.Co. for the use of the Am.Pot.Co. cutter for thirty days @ $40.00 per day for one cutting a day. This work is to

start in ten days. The factory is only going to dry and grind the kelp and th then the ground kelp is to be used as a filler for the fish scrap and gypsum fertilizer that Mr.Prevet s interested in. As soon as they get running,I will try and et the data for cutting and drying so that definite figures may be had for these operations. If possible it may be that the plant may be rented for a short time to check up the results or I may be able to get the results direct.

From all that I can gather the Pac.Kelp Mulch Co. that Perkins is interest ed in is to go intt the courts for dissolution. J.H.Scott is an associate of Perkins and it has been recognized that he is a boomer. He actually shipped a about 100 pounds t the East and that is all there is to the 10 000 lbs. story.

I went to see the Standard Fertilizer Co. but the manager was out and all that I could find out was that they were not as yet using kelp as a filler. I shall see the manager as s on as possible to fin d out their connections as no one owns up t a business arrangement with them at the present time.

The boys of the Am/Pot/Co., that think they can build an improved cutter are negotiating with a firm in Seattle and one in Alaske for cutters. Another company is being proposed for the "The Coast Production Company" to ca ry on the kelp work near Santa Barbara. Thsi is still on the quiet and Porteous has been approached to take an interest in the plant. He does not know what he will do until after the 29th and the affa rs of the Am.Pot Co., are settles.

The man Howard that is purported to have started a plant in San Diego is still a mystery man to me as I have tried to track him down and have been unsuccessful so far. I got from one man atv Long Beach that he is near Coronado some where and the only place that I can figure that he is is near Imperial Beach if he is anywhere. f possible I will go there tomorrow and see f I can find his plant. He is very secretive but claims to have a method that he proposes to we work on a royalty basis. Porteous says that he thinks the man is here somewhere but I have combed San Diego and he is still a mystery to me. I have had my man on the boat keep track of the Bay

Bay and he has found out nothing. It means about 60 miles driving for me to get the information but I'll try and get the time to get it. I don't like to have ayyone slip it over right before my nose.

Friday I drove over to Roseville and saw the Kelp Products Co. Blankenberg and Sellors were there. They are having theri troubles both as to getting oney and also the Fess system seems to be a failure. This system is a rotary burner and the heat gets to the crown of the furnace and cracks have begun to show even with the small amount of work that they have done.

I have placed a man to work checking up the survey and making some studies of the kelp history etc. I haven't the time to do this personnally. Can this be passed as part of my appropriationor not? I can get him for about six weeks for fifty dollars a month. I am furnishing the Station boat but think and feel that the Department ought to furnish the man if I keep him lined up for the work. Kindly let me know what you thihk and how you feel concerning this. Also how about some experiments if we can rent a plant for efficiency runs and cost prices?

I am enclosing a notice about a plant at Agnew and send it for what it is worth. Unless something definite can be found out from here and you request it it I will not look this or the Santa Barbara place up. Neither would be worth looking into for at least three or four months and perhaps not then. What do you think about them?

This makes rather a resomme' for the year and shows that efforts are being made in two ways to get at the kelp problem:

1st Stock selling, all but "The Coast Production Company".

2nd Men in another industry that are backng the game straight.

The legislation was blocked in the last legislature at the last minute in the Assembly so Cal. is still without any law concerning the kelp.

Yours truly

W. C. Crandall

LONG BEACH PHONE
PACIFIC 1084

LOS ANGELES:
MARSH-STRONG BUILDING
B'DWAY 191 HOME A-4617

American Potash Inc.

Manufacturers and Refiners

LONG BEACH HARBOR SLIP No. 3
WATER AND SEVENTH STREETS

LONG BEACH, CAL.

June 29 1915,

Mr W.C.Crandall.
La Jolla, Calif.

Dear Mr Crandall;

I received your letter this morning, also the maps and bulletin, many , many , thanks.

Appreciating your kindness in sending them, also the fact that you had to pay postage. herewith 15¢ stamps.

The Mark Process Dryer people wrote me that they had sent you samples of the dried kelp I sent them June 1st, this kelp was 17 days enroute, & samples received here looked good considering conditions. If you should happen to make an analyses, I should be pleased to have a copy, the following data is given in case you are interested in the "soaking" of the kelp.

9 (nine) cubic feet were sent in a cask with about 1/3 sea water. the kelp weighed net, 166 pounds, average cu. ft. weight 18.5 lbs Gathered June 2nd, 12 M, shipped 4 P.M. left same night freight. I am interested to know what % the sea water absorbed under the conditions of the closed cask. (barrel- oil-).

Again thanking you for your kindness,

Respectfully

Edw. J. Porteous

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

July 2, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Capt. Crandall:

I am very much interested in your letter of June 25 and if you can manage to do so I wish you would send me some samples of the products from the Mark Dryer Company. I am very much interested in your proposed big report and am looking for it with keen interest. I have taken up with the Secretary through the appropriate administrative channels the question of increasing your honorarium and authority for an extension of your work but have received no reply as yet. So far as I am personally concerned there is no question in my mind that you ought to continue with the work, but I am not yet clear as to the attitude of the Secretary in the matter. He seems to have definitely determined that he does not wish me to personally seek contact with industrial interests concerned in the supply of potash, taking the ground that such interests should consult me at my office in Washington, and if they desire further assistance they should employ experts outside of the Department. In other words, the whole situation is more or less clouded, but I see nothing in it to interfere with your going ahead and as soon as I have some definite information on the subject I will write you at once.

With best wishes.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

THE MARK PROCESS DRYER COMPANY

GENERAL OFFICES. FISHER BUILDING

CHICAGO. ILL.

W.C.CRANDALL
LAJOLLA, CALIF.

DEAR SIR:-

YOURS OF JUNE 25TH., AND IN REPLY. WE ARE INCLOSING, UNDER SEPERATE COVER, SOME OF OUR READING MATTER, AND IN IT YOU WILL FIND ILLUSTRATIONS OF OUR DRYER. ANSWERING YOUR QUESTIONS. THE PRINCIPLE OF OUR DRYER IS SUCH THAT THE IODINE, AND POTASH SALTS ARE SAVED WITHOUT ANY ADDITIONAL DEVICES, OR CONSTRUCTION OF THE GENERAL PRINCIPLES IN THE DRYER. THE MATERIAL PASSES OVER THE POROUS HEARTH, WHILE THE TEMPERTURE OF THE AIR IS RAISED TO THE DRGREE REQUIRED TO VOLATILIZE THE ELEMENT DESIRED TO REMOVE, AND THAT ELEMENT PASSES ON ITS WAY UNTIL IS HAS CONDENSED, AND AT THAT POINT IN ITS PASSAGE, IT IS RECLAIMED IN A PROPER RECEPTACLE. THE MATERIAL AT NO TIME COMES IN CONTACT WITH THE FLAME, OR BURNED GASES, CONSEQUENTLY THE DRYING IS DONE WITH THE OXYGEN.
THE CAPACITY OF ONE OF OUR UNITS IS IN ACCORDANCE WITH THE REQUIREMENTS. WE CAN BUILD A UNIT OF ONE TON, OR A HUNDRED, OR FIVE HUNDRED. WE DO NOT FIGURE ON A LIMIT TO THE CAPACITY. 2E FIGURE ON THE SQUARE FEET OF POROUS HEARTH, AND BASE OUR CAPACITY ON THE MOISTURE CONTENT, AND THE CUBIC WEIGHT OF THE MATERIAL. ROUGHLY SPEAKING. A POROUS HEARTH OF ONE THOUSAND SQUARE FEET (10' WIDE AND 100' LONG) WOULD DRY ONE HUNDRED TONS PER TWENTY FOUR HOURS OF SIXTY PER CENT MOISTURE, BASED ON A TEMPERTURE OF 212°F IN THE DRYER. THIS WOULD BE FOR ALL MATERIAL OF THE NATURE OF KELP, AND WOULD BE ABOUT FOUR TO SIX TIMES THAT CAPACITY ON SAND.
WE USE ANY MATERIAL AS FUEL, FROM THE FACT THAT WE HEAT THE AIR, AND AS YOU NO DOUBT KNOW, AIR IS ONE OF THE CHEAPEST TO HEAT OF ANYTHING, AND AT A TEMPERTURE OF 212°F WILL CARRY OFF ALL THE MOISTURE READILY WHEN BROUGHT UP THROUGH THE MATERIAL.

THE SAMPLES SENT YOU, ARE NO DIFFRRENT THAT WOULD BE PRODUCED BY OUR PROCESS, WERE IT A TON OR THOUSANDS OF TONS, AND THE PER CENT OF MOISTURE REMAINING CAN BE REGULATED TO ANY GIVEN AMOUNT. WE HAVE DRIED TO .19 WITHOUT ANY ATTEMPT TO REMOVE ALL. WE NEVER HAVE ATTEMPTED TO BE EXACT. SIMPLY REMOVE ENOUGH TO MAKE A GOOD SHOWING, WITHOUT KNOWING WHAT THE PER CENT MAY BE. WE LEAVE THAT TO YOU, AND ACCEPT YOUR REPORT AS THE FACT.

IT MAY BE OF INTEREST TO YOU TO KNOW, THAT OUR DEMONSTRSTION ON JULY 1ST., WAS ON GARBAGE, AND THE RESULTS WERE THE SAME AS ON KELP. SHOULD YOU DESIRE A SAMPLE, WE SHALL BE PLEASED TO SEND YOU SOME. AS SOON AS WE CAN SECURE FLOUR GOLD SANDS, WE SHALL DEMONSTRATE ON REMOVING ALL THE FLOUR GOLD. IT SEEMS TO BE OUR STICKING POINT. FOR OVER SIX MONTH'S WE HAVE BEEN WRITING FOR FLOUR GOLD SANDS, BUT NO SANDS TO DATE.

OUR COST TO DRY THE KELP WOULD BE LESS THAN BY ANY OTHER KNOWN METHOD, BUT WE WOULD NOT CARE TO SAY HOW MUCH LESS, BUT ARE READY TO NEGOTIATE WITH INTERESTED PARTIES ON THE INSTALLATION OF OUR PROCESS, ON THE BASIS THAT WE CAN DO ALL WE CLAIM, AND MORE.

WE SHALL BE PLEASED TO ANSWER ALL QUESTIONS PERTAINING TO THE KELP., OR ANY OTHER INDUSTRY THAT CAN BE SUCCESSFULLY HANDLED BY OUR PROCESS, AND SHOULD YOU AT ANY TIME COME TO CHICAGO, IT WILL BE OUR DELIGHT TO SHOW YOU OUR DEMONSTRATION PLANT, AND THE SEVERAL MATERIALS WE HAVE TREATED.

JULY, 3RD., 1915

VERY TRULY.

THE MARK PROCESS DRYER COMPANY

O. S. Mark.

Copy for Captain Crandall.

#1110 West 30th St. Los Angeles Calif.

July 5th 1915.

Dr. Frank K. Cameron

Bureau of Soils Waskington D. C.

My Dear Dr, Cameron.

I received some time ago a copy of Report No. 100 on"Potash from Kelp" and a portfolio of maps of the Kelp groves of the Pacific coast.

Not knowing exactly where they came from I did not acknowledge the receipt as promptly as I should have done, but you no doubt had them sent to me and I want to thank you for them. I have also secured another copy of Senate document No. 190 which I am going to keep as a relic of my experiences in the Kelp business if I loose everything else, however we still have a little hope of turning the plant over to some one who may be financially able to carry on the work to the point of success.

I still firmly believe that the Pacific kelp is the only inexhaustable source of potash in the world and that the growing demand and absolute necessity for a home supply of potash will be the incentive that will perfect the processes of handling and cheapen the cost below the price that the trade will pay, whether we are able to accomplish that feat or not.

We are about to enter into a contract with the Canning Co to harvest kelp for them for 30 days at $40 per day and expect to be able with our machinery to deliver them a barge load of from 30 to 60 ton for that money at a cost to us for labor power etc. of about $20 per day.

In a few days we will probably have some accurate data on cost of harvesting with such machinery as we have.

Captain Crandall was recently here and is much pleased with the way Mr.E. J. Porteous our chemist who has taken Oppenheins place, is planning

matters and feels that under his management it will be possible to get some reliable and valuable information.

Our creditors have been very good to us and are not likely to make us trouble as long as we keep up the struggle to pull the Potash Co out of the hole it is in.

If we knew that the war and present prices would continue for two year we would put up the money on the Directors personal credit to go ahead which could be accomplished with about $15,000 , but if the price should drop before we made enough to get on a sound footing we would have to loose this in addition to what we have already put into it and we can not offord to take the risk.

Mr Barndt probably informed you what he was trying to do and of his failure to get the big potask men to take hold of the matter, and we are still working along the same line with others. We are not going to give up until we are dead as a Company, but I must confess that the outlook now is not very bright.

Hoping that we may see you out here again and that I may be able to give a more encouraging report I remain

Very Truly Yours

I. W. Gleason

HAMMERMILL

CHALLENGE BOND

FERTILIZERS GYPSUM AIR SLAKED LIME

STANDARD FERTILIZER CO., INC.

321-323-325 NORTH LOS ANGELES ST.

TELEPHONES: MAIN 4476, F-6036

LOS ANGELES, CAL., July 6th 1915

NITRATE OF LIME
NITRATE OF SODA
SUPER PHOSPHATE
SULPHATE OF POTASH
BONE MEAL
BLOOD
GYPSUM
COPPERAS
BAT GUANO

Mr. W. C. Crandall

La Jolla Cal.

Dear Sir:

In reply to your letter of the 29th ultimo would say that as long as conditions are as they are in the Potash market we will have no trouble in disposing of all the Kelp material that we can turn out. What the position of the market will be after this terrible condition of affairs is over in Europe is a question. We are not running regularly as yet tho our plant has been in operation and we have turned out some material. We hope to resume operations this week.

Any questions that you may care to ask me I will very gladly answer.

Yours very truly,

Standard Fertilizer Co Inc.

T. Thowler Mgr.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

July 7, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

I am very much interested in your letter of June 28 with enclosures. Your description of the commercial situation is very interesting and very valuable. I do not know that there is any necessity for great haste in looking up the chap down below Coronado, but I think it well to do so at your convenience. As I have already written you, I have requested through the administrative authorities that your honorarium be increased, but as yet I have heard nothing from the request. I anticipate no difficulty, however, and presume that in due course of time we will have the official approval of the request. I am sending you a copy of your letter of authorization for $200, which, of course, will be increased if progress of the work makes it desirable. I am informed by our Financial Clerk that if you desire to employ your man from time to time or for a week or two at a time you can do so by taking the proper voucher receipt from him and putting it into your expense account. If, however, you propose to employ him continuously for over a month it will be necessary for us to get him a regular appointment. This we can do if you consider it necessary and desirable, but we would rather not take it up with the appointment authorities unless you feel that it is decidedly necessary. Before going further

in the matter I will await your advice as I do not understand myself whether you would prefer to employ him by the day on the days on which he works with the idea that the sum total would not exceed $50 a month or whether you think it is necessary to employ him at that salary for continuous work.

Sincerely yours,

Frank K Cameron

FRANK K. CAMERON.

In Charge.

Enclosure.

July 9, 1915.

Standard Fertilizer Co.,

321 North Los Angeles St.,

Los Angeles, Calif.

Gentlemen:
(Attention Mr. Thornton)

In your letter of July 6, you speak of your plant as being in operation and that you will resume operations this week. For the information of the Bureau of Soils, will you let me have the name of your plant; its location; and capacity on wet kelp per day.

Thanking you for the information you may be able to give me,

I am very sincerely yours,

WCC/Ky

July 9, 1915

Frank K. Cameron,

Bureau of Soils,

Washington, D. C.

Dear Sir:

I have already sent to the Bureau my samples of the products from the Mark Dryer Co. You should have received these several days ago. I have a Mr. Nichols teacher in the Oakland High School, working up data concerning the growth and development of the kelp. He and James Ross re-surveyed the beds from Point Loma to La Jolla last week. This week I have had Mr. Nichols working with Mr. Barnhart of the instutition upon marking certain plants in a similar manner to that in which I marked them three years ago, but with this difference: that I have told them to work upon plants in all stages of growth. In addition Mr. Nichols is carrying on some concrete studies on the method of growth in young plants. I can see in this study a possible reason for new shoots appearing after the first predominating shoot has been cut off or destroyed. Already some interesting facts are coming out concerning this fact.

I hope that the secretary will see fit to permit me an allowance for this work, as my previous private fund is not sufficient to cover the expenditure. This expense will amount to about $100.00 for Mr. Nichols, $15.00 for rent for boat for survey and some $5.00 or $10.00 for materials used in the experimental work.

July 9, 1915.

I have heard nothing concerning my own appointment for the next year and have no number in the department unless my old number, (59-So.) holds over. I have no authorization for traveling expenses or experimental work. I have rather assumed that probably you were going to discontinue the position of collaborator, at least officially. It would be well to have some kind of paper available if you desire to have me continue the work in and about Los Angeles and San Diego.

At the present time I am very busy, the Station affairs taking up most of my spare moments, but still I shall find time to at least advise about the performance of the experiment on the kelp.

With best wishes to yourself and Mrs. Cameron and Turp, I am very sincerely yours,

Collaborator.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

July 16, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

Your letter of July 9 reached me two or three days since but I have been refraining from replying to you in order to be able to write you something definite. I have just learned that the request for your increase in honorarium is being held in the Secretary's Office pending his return. When this is likely to be I do not know any more than I know why the matter was not acted upon promptly.

The samples dried by the Marks people have turned up, two of them in a badly delapidated condition. The bottle was entirely smashed and little but a bad odor in part of the mailing case left. The other materials I have examined with great interest. They look much like Balch's parched kelp. In fact, I cannot see that there is any essential difference. The really important thing we would like to know in this connection is how much the Marks people think it will cost to dry the material.

The other matters broached in your letter I have under advisement but will not be able to act on them until we get some definite expression from the Secretary. The interest in the kelp as a source of potash seems to be steadily growing. I have just received a letter from the largest fertilizer manufacturer in the East asking for a personal interview on the subject and I have this afternoon further received a personal letter

from a prominent and influential Congressman urging that official action be taken to push the development of the kelp as a source of potash. Of course I can do nothing without the consent of the Secretary of Agriculture and I am entirely in the dark as to how he will feel towards the subject in the light of these letters. As the matter now stands it would appear that the Secretary's attitude is that we should cease work for all time on the kelp, but I am loath to believe that this is the proper interpretation of his attitude and am awaiting further light.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

July 20, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

I still have your letter of July 9 before me but as yet I have received no intimation from the Secretary's office as to where we stand on our proposed plans for continuing kelp work and so am writing merely to assure you that I have the matter in mind.

Sincerely yours,

Frank K. Cameron.

FRANK K. CAMERON.
In Charge.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

July 22, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

I am enclosing your new commission which I hope will prove acceptable. The whole subject of our future work on kelp is under consideration and discussion with the Secretary at the present time and I shall probably be able to write you more definitely in a few days. Meanwhile, I trust you are having opportunities to go ahead.

With best regards to Mrs. Crandall and our mutual friends.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

Enclosure.

1151 South Hope St
Los Angeles
July 27th 1915

Capt. W. G. Brandall

La Jolla

Dear Sir

I am much obliged for the information with reference to the extent of the Kelp beds in the vicinity of Santa Cruz which will enable me to determine the quantity of available raw material,

Yours very truly

J. C. W. Stanley

August 6, 1915.

Dr. Frank K. Cameron,
Washington, D. C.

My Dear Dr. Cameron:

Your letter of July 29th at hand, the list of companies that you called for are:

Pacific Products Co.,	Long Beach, Calif. Office, Same.
Pacific Kelp Mulch Co.,	Office 227 Higgins Bldg., Los Angeles, Calif. No plant.
Potasium Mfg. Corporation,	L. A. Story [illegible] Bldg., Plant El Secundo.
American Potash Co.,	Long Beach, Calif. Office Same.
Columbia Kelp Co.,	Office L. A. Investment Bldg., No plant.
The Coast Production Co.,	Long Beach, Calif., Office Same.
The Kelp Products Co.,	Roseville, San Diego, Office Same.

Concerning the latter company, will state that Mr. Rolland, the selling agent of Swift & Co., Chicago made arrangements while here to lease the plant and try out drying kelp, grinding and sacking. I was over last Sunday and noted several changes being made, the most important one being a barge which will hold 125 tons of wet kelp cut. Upon receipt of your letter yesterday I went over to the plant and had a talk with Mr. Blankenberg. He tells me that Swift & Co. have sent out one of their engineers, Mr. Smith, who is building a cutter which is practically the same as the one in the report 100, except that it does not have the vertical cutting bars. They bring the material in in a barge and not in nets. The plant itself is being changed in that a carrier is being installed at the lower end of the drum wich will catch the kelp and carry it up into a grinding machine and from the grinding machine drop the material into sacks. Swift & Co. are putting up all the coin and have leased the plant until Oct. 1st, 1915. They have not taken any option in any way upon the plant after that date and all of the changes made in the plant and installations upon the barge revert to the company, that is the kelp company after Oct. 1st. The harvester is about ready for installation upon the barge and will be tested out within a couple of weeks, they hope to be making test runs within three weeks.

Mr. McCloud of the Royster Phosphate Co. was outhto see me night before last. He has just completed a test run at the American Potash Plant, at Long Beach. He was down here looking over the local plant and possible locations otherwise. He seems very much bent on going ahead. I rather suspect that he will lease the American Potash Co. Plant or else back them up so that they can go ahead. I hope to have a chance again tomorrow or next day so as to try to thrash out more of what he anticipates doing. I am going to Los Angeles this afternoon to go over the situation there, will write you details of the report on my return.

Yours sincerely,

WCC/Ky

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J
PHYSICAL AND CHEMICAL INVESTIGATIONS.

August 12, 1915.

Capt. W. C. Crandall,
Scripps Biological Institution,
La Jolla, California.

Dear Crandall:

Yours of August 6 is just at hand and is the most interesting letter I have received for some time past. I would like very much indeed to see both the Royster people and Swift succeed, but I am afraid that they have made a mistake in not sending chemists or chemical engineers to the Coast. I have told young Mr. Royster so and one of their Assistant Managers will be here this afternoon to talk to me and I shall repeat my opinion to him. I wrote to Swift & Co. last week, asking about their work at Rosedale, but have had no reply from them as yet. I am looking forward with great interest to your report of the visit to Los Angeles. There is nothing definite to report on the potash work as far as we are concerned, but there is a good deal of agitation and a strong under-current which may bring some definite action at almost any time. Currentine is away for a month canoeing.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

TJN/EL

FRAZAR & COMPANY
50 CHURCH STREET
NEW YORK

CABLE ADDRESS
FYDAMA, NEW YORK
CODES
PRIVATE A.I., A.B.C. (FIFTH EDITION)
LIEBERS, WESTERN UNION, BENTLEYS

August 12, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Cal.

Dear Sir:-

We have been advised by the Bureau of Soils, U. S. Department of Agriculture, that if we communicate directly with you, we may obtain some information in regard to the Kelp matters. Could you tell us who manufactures the harvesting machinery on the lower Californian Coast. Will you also tell us the names of some of the manufacturers of the Driers and other machinery for the treating of Kelp?

Thanking you in advance, we are

Yours very truly,

FRAZAR & COMPANY.

Theodore J. Feddermann

R.F.W

August 16, 1915.

Dr. Frank K. Cameron,
Washington D. C.

Dear Dr. Cameron:

Last Friday/week I went to Los Angeles to go over the kelp situation. I first went to see the American Potash Co. and met there Mr. Aldolphus A. McLeoude of the Royston Guano Co. who was confering with Mr. Porteaus. Mr. McLeoude wanted either to subsidize the American Potash Co. or start a plant of his own or to quit the game and go home. He and Porteaus had made a test run of 44 tons in which they got out a little over four tons of dry material and their cost was about $23.00. Working separately and upon different lines and alowing three dollars for depreciation and interest charges, they figure that dry kelp could be produced for $18.00 per dry ton. Porteaus also had a letter from the Universal Dryer Co. which he let me read, in which their figures came out about the same. Their price of production then, per dry ton is just twice as great as we had figured in our former work. The point of difference was in the drying process. The harvesting expense was just about our figure, in fact just a little lower. McLeoude's proposition to The American Potash Co. was to furnish them $8,000.00 cash with which to apease their creditors and then to pay them $22.50 per dry ton sacked on board ship, San Pedro. McLeoude was very frank with Porteaus and stated his own three considerations that I stated above.

Porteaus extended to McLeoude and myself the privelege of taking their boat "Golden West" for a trip to San Pedro, where we went through the old Pacific Kelp Mulch Co. This plant is now dismantled, but there are a few tons of the dried kelp still on the floor, all of the machinery has been removed. We then went up to Wilmington and saw the old Lohman cutter, which might easily be put in commission again. It is now beached just above the Wilmington slip. We went back to Long Beach and found that Lorenzo A. Wilson of the Wilson-Toomer Fertilizer Co. of Jacksonville, Fla. had visited the American Potash Co. during our absence and the he was considering the South Coast Production Co. plant that was started as I wrote you a couple of months ago. Dodson, the owner was trying to either sell or lease the plant to him. In order that he produce dry kelp, Dodson spent $500.00 in producing five tons of kelp so he is anxious to get from under. You recall that I had told you that he had rented the cutter of the American Potash Co. That is all he has done, as he has not paid his rent. McLeoude evidently suspicioned Wilson's trip to the American Potash Co. and warned Porteaus against any double-cross. Gleason was there, but I only talked to him for a moment or so as he was in a hurry to catch a car. He told me that they had this one proposition on with McLeoude, also that a man by the name of Naylor had made a proposition to but the plant outright, and he hoped that one of the deals would go through. This man Naylor seems to be a promotor and has handled rather large commercial projects before.

I went over to the Pacific Products Co. and saw Metz, he proudly showed me the side-walls of a factory building, but they have not either finally agreed upon a rotary dryer nor placed an order for machinery, so that I could not see the value of their building.

He however, was still as enthusiastic as ever about what they were going to do. Neither Schoaf nor Fischer were about so I do not know what their exact plans are. They do not seem however to be useing any better business sense now then they did when at White's Point.

The South Coast Production Co. has closed down subject to sale.

The Potasium Mfg. Corporation still has it's pills on the ground at El Segundo, but have done nothing more than my last letter to you, concerning their progress. They claim to have their machinery ordered, but so far as I know, it is only a claim. I rather suspect they need cash before they can get delivery and doubt whether they can get either.

I inquired further about Howard and was assured that he was in Coronado and so I went over to find out. I saw the building inspector over there, Mr. Welsch and one of their Police officers, but I could get no information whatever from them other than that they did not beleive such a plant existed there. I also saw some of the Spreckles people and they also disclaimed any knowledge of a location of a plant. With the exception of the Purser on the boat, who had heard rumors, but knew nothing definetly. I am still in the air in regard to place or method of proceeding.

The Kelp Products Co. is leased as per my last letter to the Swift people until October 1st. I shall run over there the latter part of the and note what progress they are making.

Today I had a visit from David Wesson, mgr. Technical Dept., Southern Cotton Oil Co. 24 Broad St., New York. and he is trying to get all the information he can get regarding potash. He spent a couple of hours with me this afternoon talking over various phases of the industry. He has been up around Salt Lake investigating the salt beds, at Searles Lake, investigating the bryan wells, and is now looking over the grounds of Southern California.

A couple of fishermen have been burning the kelp next to the "Lake" between here and La Jolla. During the heavy storm in April, a large quantity of kelp was washed ashore and has been drying there ever since. They are now gathering this together in heaps, burning and sacking. They don't know what they are going to do with it, but are going to try to sell it. I suspect by this time that the salts are all bleached out and that as a fertilizer, they will have little left. I will try to send you a couple of samples, so that you may test it out. It would look better to me if used simply dry rather than burned.

The remarkable thing at present in the West is, the presence of Eastern fertilizer men, who want potash and want it very badly, and who are willing to either subsidize or build plants in order to satisfy their Eastern needs.

I am not ready yet to send in the report concerning the experiments which we have been carrying for the last six or seven weeks, but hope to have a preliminary report within a week or ten days.

Yours sincerely,

Collaborator.

WCC/Ky

Aug.18th 1915.

Dr.Frank K.Cameron,
Washington D.C.
My dear Dr.Cameron.

This thing of corresponding when one has a finger that is busted up i is no snap so will make a report as briefly as possible on the latest d ings Yesterday I happened to be at the Cal Iron works about some Station business and incidentally mentioned that I was interested in a machine that they were building for Smith of the Swift people. The kindly took me out and intr duced me and then we had a chat abo t the game and then I took him up town with me in the Dodge and we got better acquainted. I got him limbered up somewhat and got a story out of him. He is an evasive sort of fellow in some ways to start with.

He had had a visit from a Dr. Van Herd or some such name who is a representative from the Kali syndicate and this man was trying to get full information as to what was doing and throwing out hints as to what the Syndicate could do with a low price on their product when the war is over and thus put kelp out of the market. He has been over the whole field throwing out hints of the same kind it appears.

Smith has put up a cutter or harvester that is very similar to the Lohman harvester and he was much surprised when I told him that his was the thrid one that I had seen. He then loosened up and inv ted me to go ou out with them when they got theirs to running and see them work the machine wh ch they expect to be in worki g order in about ten days. They were just assembling it upon the barge yesterday and expected to have it com pleted today sometime.

As to their future actions,Smith said that if the experiment went along nicely that he wou d then install a plant for the Swifts on a large scale and produce the potash for their fertilizer. He realizes that they have to have potash and they are n the game to try and get the goods themselves. He figures that they have the jump on all the other eastern houses a d will be in a position to be the principal factors in the fertilizer business if ths works out next year. Also that if the Germans can get back into th game that they will then be forced out of business. They would then quit an get their potash as before.

There is s meone experimenting in Roseville on kelp and I shall run o ver therebtomorrow afternnon if possible and see if this is the Hward proposition that has been so elusive. An old yacht club building is the on that is being used for the experimental plant.

I have heard nothing more from the L.A.situation and will be too busy to get up there for some time as the pier is gping to keep me very busy for ab ut forty days.

Yours sincerely

W C Caudall

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

August 24, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Calif.

Dear Crandall:

I have your letters of August 16 and 18 which interested me very much indeed. I am very sorry indeed for the "busted finger", but hope that long ere this reply reaches you it will be entirely recovered. Dr. von Hofe is an agent of the American propaganda of the Kali Syndicate. He is a learned gentleman but has absolutely no sense of humor and consequently it is somewhat difficult to get along with him. As far as the Syndicate's activities are concerned, they have three and possibly more agents at work on the Pacific Coast at the present time. It seems that they are thoroughly convinced that potash from kelp is going to be an American industry some time in the future, but that it would not be politic for them to attempt to develop it themselves and so these employees or promoters in their employ are under instructions to carefully watch the situation and if any reputable concern starts to develop potash from kelp with a prospect of success the promoters are to go to the concern and offer financial assistance. The explanation which has been given to me by one of these agents is that the Syndicate is unwilling to go into a price-cutting campaign after the war or at any time and they prefer to be in a position where they can insist upon a division of the market based on the merits of the kelp proposition. At the present time their idea is that the Pacific slope and possibly Hawaii

should be handed over to the potash from kelp while the German salts would supply the rest of the world. One of these promoters has visited me personally and has shown me papers and memoranda and accounts of his expenses in the interest of the Kali Syndicate in the past four or five months so that there can be no question as to the accuracy of the statements I have made above.

I am more or less disturbed over the present situation in kelp. Royster's man has proven himself an able mine superintendent but he is not a chemical engineer. Swifts' man is not a chemical engineer, or so I understand. I have been in communication with Swifts at their head office in Chicago and they have been very polite and have invited me to visit them either in Chicago or at the Pacific Coast and they will show me everything they are doing and propose to do. However, owing to the present attitude of the Secretary of Agriculture, I do not see my way to accept this invitation and I am very much afraid that they will make a failure for want of a little assistance and advice. I hope you will do the best you can for them. The only man with any technical ability, so far as I know, who has gone to the Coast is Mr. David Wesson. Mr. Wesson has made a great success of a method for clarifying cottonseed oil and he is a prominent factor in the Southern Cotton Oil Company, which Company is controlled and largely owned by the Virginia-Carolina Chemical Company, one of the largest manufacturers of mixed fertilizers in the country, and Mr. Wesson's efforts are, of course, in their interest. I am in close touch with the Virginia-Carolina people at the present time and have been urged by them to tackle the kelp problem in their interests on a furlough from the Department, but I am unable to do this because of the disapproval of the Secretary of Agriculture.

Mr. Lorenzo Wilson is one of a group of so-called "Independent Fertilizer Manufacturers" whom I had brought together with a view to forming a pool to start a potash from kelp plant on the Coast. The matter was being worked up by a committee who held one or two meetings and finally arranged for a meeting last July at Hot Springs, it being understood that I was to be present, and it was also understood that I was to accompany them either at the government's expense or their own to go over with the committee the available sites and outline methods of procedure. The Secretary of Agriculture disapproved of my going to Hot Springs or to the Coast and sent me instructions to do nothing further except answer letters or such questions as might be put to me by visitors to my office in Washington.

There has been some correspondence between the Secretary of Agriculture and the Chairman of the House Committee on Agriculture, the tenor of which is that the Secretary is unwilling to assist any but known reliable companies, but that he would assist such if they would pledge themselves to the Department to make a reasonable expenditure in the commercial development of potash from kelp. I understand that this letter of the Secretary's has been published by Congressman Lever, but up to the present none of the companies to which reference was made has appealed to the Department. It is, of course, a fact that every one of them had been in communication with me before the letter was written and I had visited most of them and gone over matters with them very thoroughly, and I am still receiving from time to time letters from them. It is probable that others will show up from time to time and that you will meet a good many Eastern men this summer. I think we have an exceptional opportunity to be very

useful and to get the industry started by reliable people, but of course we must accept the judgment and obey the directions of the Secretary of Agriculture and there appears to be very little that we can do beyond answering questions.

I am giving you the above statements to guide you as far as I can in dealing with these people and I certainly am very much obliged for the thorough and detailed information in your letters, which are very helpful in posting me as to how things are going.

Sincerely yours,

Frank K Cameron

FRANK K. CAMERON.

In Charge.

I wrote what you say about Porter's figures for drying. They do not disturb me and I believe we could show the substantial accuracy of our estimates if we had a chance at a practical demonstration. F.K.C.

Yours Truly

Sept. 3rd 1915.

Dr. Frank K. Cameron,

Washington, D.C.

My dear Dr. Cameron:

Your letters of recent date have been received and I am glad that you have been able to get something out of them.

Yesterday the men who were burning between here and La Jolla came in with their product and are wondering what they got. The felloww who is at the head of the affair is

F.M.Collins Address La Jolla

Burnt the drift kelp that was blown ashore last April.

Collected about 70 sacks of ashes. after burning in the open.

Ashes put in water and leached out and then water evaporated.

Got about 20# to sack which weighed about 60# to the sack.

Sample sent separtely a is from 5 sacks that they have leached out.

At present they are burning the kelp that is near the Pacific Beach ocean front. They don't know what they have but they are after finding out. The men are three in number and are ighorant fishermen but they are at the g game. They are now drying the wet kelpmas it washes ashore and are trying to get the salts from that. They claim that they are able to burn in from three to 5 days.

Yesterday afternoon I went over to the Kelp Products Co. and looked at the new cutter. I didn't see Mr. Smith but I found that the cutting appar atus had been tri d and was found satisfactory so that he is now going ahead w'th the other parts of his plant. They are tearing out a lot of the carrier and are otherwise changing things. However the cutter is about like all

the others and as I thought is satisfactory. They ought to be using it in a few days now a d then we can watch the rest of the process and see how tha part of the proposition is going to turn out.

I have not heard anything from Los Angeles this last month i.e. since I was up there but hope that I can get away sometimg in the next two weeks to see what is going on in that neck of the woods. Either some of the deals are competed or else everything is off with the propositions and the men involved sore a d ready to give up.

If you have a ew more hours per day running loose in Washington, send them out this way as work demends more hours than the day seems to have. Give my best regards to the good wife.

Sincerely yours,

A.D. Chandler

THE SCRIPPS INSTITUTION FOR BIOLOGICAL RESEARCH
OF THE
UNIVERSITY OF CALIFORNIA

LOCATED AT LA JOLLA
NEAR
SAN DIEGO, CALIFORNIA

LA JOLLA, CALIFORNIA,

Sept.4th 1915.

Dr.Frank K.Cameron,
Washington,D.C.

My dear Dr.Cameron:

I received a letter from Mr.Forteous today stating that he would be down here with the Golden West about Wednesday of theis week. He states that the American Pot.Co. deal with the McLeod interests fell through and that he is now with another company. You possibly can guess the company as he states that it is an Eastern Co. that wishes to hide its identity for the present and that he is now going to check up my survey of the local beds and look for a location for a 900 or more ton perm day plant. The com any evidently wants to make Potash from Kelp. He states that he thinks that they will make a go of the propostition if such a thing is possible as they have plenty of money. He is going to call me up and wants me to go alo g on the tr p for a day which I will try to do.

This is allthat I haveon my list at present. Thanks my finger is in good shape again except for the presence of a good nail. The hurting part is now a thing of the past.

I suspect that you have the sample of salts that I sent to you a few days ago.

Yours sincerely,

WESTERN UNION TELEGRAM

Form 1864

GEORGE W. E. ATKINS, VICE-PRESIDENT — NEWCOMB CARLTON, PRESIDENT — BELVIDERE BROOKS, VICE-PRESIDENT

D-36-W-1
Williams
548P

RECEIVED AT 20 By B 40 govt

A Washington D.C. 415P Sept 8-1915

W.C. Crandall, Scripps Biological Institute La Jolla Cal.

Consult I Naylor reliable gas regulator Company Pasadena Regarding new process consider information Confidential mail us report Geo. W. Simmons Vice President Simmons Hardware Company consult us today and suggested this.

Whitney 532p

Long Beach, Calif.

Sept 4, 1915

Capt. W.C.Crandall
Scripps Institute
La Jolla, Calif.

Dear Friend Crandall;

I am leaving in the "Golden West" for San Diego to look over the kelp situation there, having closed my contract with the American Potash Inc, owing to the fall out of the McLeod proposition, on Sept 1st.

I am engaged for the present month by an Eastern company who do not wish their identity known, to look over the kelp beds to see if there has been much change since your survey, also to obtain a possible location for a large plant to handle 900 or more tons green kelp per 24 hours. this Company hasthe financial backing to make the 'Potash from kelp' a go if there is any 'gO' in it. they are,and will spend quite a sum to satisfy themselves first before they enter the arena.

Then they will erect unit plants along the coast where ever the kelp beds warrant a supply of at least 1000 tons per day.

I should be pleased if you could spare the time to go over the San Diego beds with me, even if it was but for a single trip, will phone you from San Diego Tuesday or Wednesday, if plans go as directed.

Yours Respectfully

Edw. J. Costeau

Sept/ 9, 1915.

Dr. Frank K. Cameron,
Washington, D. C.

My dear Dr. Cameron:

Yesterday, Mr. Porteous called to see me and from him I learned conditions in Los Angeles. The Potassium Mfg. Co. fired Dr. Oppenheimer about two weeks ago. Porteous is still of the opinion that Oppenheimer has a good deal 'under his hat' but that what he knows is being kept and not being given to the company that he has been working for. The company has not done any more development work than when I last wrote you. The Pacific Products Co. at Long Beach have completed their building but have not proceeded to put in any machinery. On account of the banks in New York believing that the war will close by January first, Mc Leod of the Royster Guano Co. was refused financial backing to the extent that he would have had to have it in order to obtain the plant of the American Potash Co. for a period of two years. It seems that McLeod had telegraphed for his wife to come to California and that Porteous had rented his house in Hollywood when the telegram from the banks was received, so everyone was very much disappointed. As result, Porteous was out of a job September first.

On the first of September, Porteous began working for a company that he would not name but which has four parties in the field and is willing to sink $500,000.00 in the kelp game if they can get the salts out from the pulp and can get a sufficient quantity of kelp. They want units of a size sufficient to handle 1,000 tons of wet kelp daily. Last night I received Chief Whitney's wire concerning Mr. Naylor of Pasadena and I should judge that the small experimental plant that is operating at Roseville in the old Yacht Club building is one of Naylor's parties. Porteous on the Golden West has formed party number two and then probably a party around Santa Barbara and possibly one around Santa Cruz. This is guess work on my part but I will leave for Pasadena this afternoon so as to answer Chief Whitney's telegram before Sunday.

Swift & Co. had their cutter out working yesterday for the first time. Sunday, I will try to get over and fine

how successful they have been. Porteous told me that the cutter looked about like the one they had been using in the north. They only have twenty days to work out their experiment before their option is up with the Pacific Products Co. at Roseville.

I have at last found out about Howard. He is now a traveling automobile accessory salesman and has simply been giving me a 'wild goose chase' about the country. The nearest that he has been working on a kelp proposition was possibly a trip over the bay on the Ferry, Ramona or Coronada. Some time I should like to get hold of this fellow and in some way, get even with him for all the trouble he has given me by his false statements made around Long Beach.

Yours very sincerely,

WCC/K

Sept/ 9, 1915.

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Washington, D. C.

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WCC/K

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

La Jolla, Cal.

Sept. 11th 1915.

Hon. Milton Whitney,

Washington, D.C.

My dear Mr. Whitney:

Your telegram of Sept. 8th reached me too late at night to permit my getting away for Pasadena that night to see Mr. I Naylor on Thursday so I went up Thursday afternoon and then spent Friday morning talking with him. I first went out to the Reliable Gas Regulator Company at Pasadena and met Mr. Ruggles, the superintendent. Mr. Naylors laboratory was in the center of a machine shop and was enclosed in a corrugated iron enclosure that was evidently very carefully guarded and locked. While there I was shown a number of nail boxes etc that were being made from the fiber of cornstocks. Mr. Ruggles told me that they had done experimental work for many years, in fact that he had been with Mr. Naylor for nine years and that they had moved from place to place while experimenting upon different fibers that might be obtained from waste wood etc. and that during this time they had been burnt out five times. He did not give me the details of the work but in the enclosure there was a series of vats in which they were evidently macerating materials that were later put in a press and made into boxes. I was shown some nail boxes, cigar boxes, knife and tool handles etc. I then went over to see Mr. Naylor at the Lankershim Hotel in Los Angeles.

I have already reported to the Department that Mr. Naylor had been negotating with the American Potash Company of Longbeach. At that time Mr. Gleason told me that Mr. Naylor was trying to get aid in a financial way from parties in San Francisco. This deal apparently fell through and

and that fact together with the fact that Mr.McLeod was unable to carry out his desires for the Royster Guano Co. cuaused the American Potash Co. to close up and let their chemical engineer,Mr.Porteous go. Mr.Naylor then hired Mr.Porteous for the month of September and also chartered the "Golden West" from the Am. Pot.Co. and he had placed Mr.Porteous aboard and started a private survey of the kelps between San Diego and Santa Barbara. Mr.Porteous visited me last Tuesday as per my last report but at that time he would-~~netnstae~~ not state with whom he was associated. His work checked up very closely to the new survey that I have just completed and which will be forwarded in a day or so of the San Diego region. In this survey I may say that the local beds are not more than 60% as large as the survey showed in 1912.

Concerning Mr.Naylor and his project, I found that he has known Mr.Geo.Simmons for a number of years and that they have been associated together in several affirs that Mr.Naylor has started. Mr.Naylor's chief work has been with waste materials and in this part of the work he has often confered with Mr.Pinchot and Dr.Bristol. His constant effort is to get materials that may be used in box making and this accounts for the manner in which he came into the kelp work. About two months ago he began investigating the kelp and went over with Mr.Porteous the methods,costs, market etc. of the Am.Pot/Co. and also got ideas as to the amounts of finished products. He was impressed with the fact that they could not make money in the way in which they were working and so started out on his own hook. He took some kelp to his own laboratory (which I did not see, nor could I draw an invitation to seeit) and there wnet after it just as he had other materials for fibre. After treating it in the same manner as ~~etc~~ other fibre material he was able to separate out the pulp from the salts. -his pulp was not fibre pulp but the cellulose material of the kelp. This material was what he was after for the paper for box making. From the salts he went to work and extracted first iodine,second NaCl, third KCl and fourth K2SO

and fourth K2SO4. In other words he reversed the order of the kelp companies that were seeking the ~~saats~~ and got the various salts out. This work was accomplished by first neutarlizing the kelp and then putting it through some form of press. After this he took the salt filtrate and charred and leached and got the other things out in the reverse order to the usual proceedure. The method that he used he would not describe in detail but only in general ~~terms.and~~ He stated that he had applied for patents to his method of proceedure and that these patents would be issued in his name. If this has proceeded far enough, you probably have the data at hand to follow out the method in detail.

Mr. Naylor will not considere putting in a plant unless he can have a supply of 1000 tons of wet kelp per day for the year through from one bed i.e. he wanted 300 000 tons per year from on bed. From what he wanted and the conditions that he stated, I do not believe that as the beds now show he can find such ideal conditions. I so told Mr. Naylor and asked him why he should not use two or more beds but he was wary of doing such a thing. Since talking with Mr. Naylor I have checked up the San Diego beds as they now are available and find that they would stand such a cutting but it would run them down faster than the State would permit for any length of time. The largest bed as surveyed in 1912 showed 5.4 miles. This bed now is only 60% as large as it was in 1912 besides being much thinner. Also the Federal Government will not permit the cuttin of kelp for a radius of 1 mile form the Lighthouse on Point Loma. This cuts down the available bed materially and t is fact together with the fact that others will ~~undoub~~ undoubtedly cut from the same territory would leave reason to doubt the ability of the bed to meet Mr. Naylor's demands. Mr. Naylor had taken and used totals given in the survey without paying attention to the fact to the individual beds and so was surprised at the fact that the kelp was not as available in a given locality as he has expected. However the report that he had just received from Mr. Porteous bore out my statements to him. He states that he absolutely will not do anything with kelp unless he c

WALEA, COMEDIE EN UN ACTE EN VERS

havevat least 1000 tons daily. Another point that he had not looked up fully was the fuel problem and in this he says that unless he can get cheap fuel that thee would not be enough money in the kelp to warrant his advising his associates to enter the kelp field. The installation of the plant would take from $400 000 to $500 000. He would get products of pulp and salts.

In talking over the salts, Mr. Naylor made the claim that by his method he got unheard of amounts of salts, fertilizer and pulp. He claimed that he would get about 25% of the wet kelp in pulp. He did not give the figures for the other salts but claimed that they were greater than any figures so far given and that his results were checked up by ~~three~~ four separate sets of chemists and that they had all practically agreed in their analyses. That Mr. Porteous was one of these and that Mr. Porteous had checked and rechecked as he could not believe that the figures could be true. I am sorry that I can't tive you his figures but it was impossible to get them.

At present Mr. Naylor says that he has a representative in Alaska investigating conditions there; that he will soon be in Washington and that he will be pleased to set up an experiment there and make a run demonstrating to you and your force the method and results that he has obtained. He says that his method is one of extreme simplicity and that it is nothing more than he has used for a length of time in his other fiber work. In this connection I may say that when I asked him how he used the term fiber, he said th that it was a stock term with him and indicated only a pulpy material and not fiber as ordinarily spoken of.

I got acquainted with Mr. Naylor on this trip so that a little later I hope that I can get more exact information from him. I only saw one laboratory and did not see that one that he mentioned as containing retorts etc. All of these I hope I can report upon later.

I also dropped in to see the Potassium Manufacturing Co, and they are not going ahead at present as they have not been able to satisfy the "Blue Sky Law" Commission.

Sincerely yours

WUFF-EY. COMPRESS FILM EMBOMB 13 Dec 7

Condition of Beds at Various Times of Year

La Jolla Cal. Sept.17th 1915.

Chief, Bureau of Soils,

Washington D.C.

Sir:

At this time I desire to submit a partial report as to the progress of my work at La Jolla u on the survey of the kelp and the rate and character of its growth. The work has been done through the assistance of Mr.M.B.Nichols of Oakland High School and Mr.P.S.Barnhart of the Scripps Institution. The charting of the kelp beds was possible because of the kindness of Mr.Jack Ross (who accompanied me on the trip to Puget Sound) lending me his launch so that Mr.Nichols could make the run around the beds. Mr.James Ross of the Agassiz acted as engineer and allround aid.

The charting was performed during the latter part of June and continued through the 1st and 2nd of July. That part of the beds lying between Whistling Buoy off San Diego, and Point La Jolla. From a study of the new charting, my former reports as to the condition of the local beds is confirmed as the beds now show about 60% of their former size and their thickness is greatly decreased. The chart is marked "Exhibit A".

From previous reports made during the last year, you will recall that I have reported that the beds around San Pedro are heavier and larger than when I first surveyed them. It is barely possible that this is due to a periodic change and that a comparison of the characters of the local beds with those of San Pedro will show that there are definite periods in which we may expect the beds to become thicker and again thinner. That this is possible I reason from the fact that last year storms of nearly equal strength visited the two regions and yet the Northern beds suffered far less than the outhern Beds did. This might be due to the fact that there were more aged plants in the local beds that were more brittle and ready for breaking away. The fact that the beds did show a difference towards the action of the sea leads me to believe that there is some additional factor present. Another factor that may have entered is that the local beaches showed tremendous movements of sand along the coast and it is possible that there was no such marked movemen in the region of the Northern Beds and thus the holdfasts were not pounded and bruised now the lowere stipes. If ~~the~~ theory One is true then we may expect to see the local beds become heavier ~~shortly--the~~ in a year or so and

Northern Beds become thinner. Such a condition we now know to be true of the Nereocystis and might easily be expected to be true of the Macrocystis.

Part #2 of the experiment was the consideration of the rate and method of growth of the kelp. For this purpose Mr. Nichols was detailed to try and get a number of small plants and anchor them ~~it~~ so that we might watch them. At this time he discovered that there were a number of very young plants floating about on the water so a number were taken, labeled, attached to sinkers and then let down into the ocean in various places to see the effect of the various conditions upon the rate of growth and the possible total length of growth. The locations of these plants were marked by means of floats made from 4x4 redwood ~~te~~ painted with white lead and numbered serially in black numbers, placed in locations fixed by cross bearings. These locations were as follows:

Float I Sign on Concrete Wall at Bath House and Flag Pole on Hill. Line of Road at Longbeach. End of bed next to Boat Anchorage.

Young plant attached to sinker.

Float II Park Flag Pole and Peak of Gable Roof. Road at Longbeach middle of Barn Roof. End of bed next to Boat Anchorage.

Young Plant attached to sinker.

Float III Park Flag Pole corner of House behind Hotel. Line of walk uphill East of Bathhouse. Middle of bed.

Young Plant attached to sinker.

Float IV. Sign under middle of Red Roofed House. Park Flag Pole and Third Tall Tree from Cabrillo Hotel. Outside of bed.

Young Plant attached to sinker.

Float V Sign under Right End of Red Roofed House. Park Flag Pole between two houses Top of Hill. Outside of bed.

Young Plant attached to sinker.

Float VI Park Flag Pole and Peak of Cottage between Cabrillo Hotel and Apartments. Sign middle of Red Roofed House. Outside of bed.

Young Plant attached to sinker.

Float VII Park Flag Pole corner Colonial Hotel, sign under Red Roofed House Outside the Boat Anchorage. An old floating plant that was taken and anchored to the bottom again.

#3 Report to Bureau of Soils 9/17/15.

Float # VIII Conservatory and Pole at End of Conc-rete Wall. Road under Red Roofed House. Inside of bed.

This was an old plant that was pulled up and after measurements were ~~tak~~ taken was replaced on a sinker and replaced in its old position.

Float IX. Sign under Red Roofed House. Park Flag Pole middle Concrete Wall. Inside of Bed.

In explanationof the tables, it must be noted that frequently two or more small plants were attached to the same sinker and these plants were marked ## composed of more than one principal branch on one branch only and the other one was left unmarked. Note that the pags of Table #3 should be placed side by side in order that he correct comparisons may be made.

See accompanying Tables I?II,III.

From the study of the plants it was not d that there was an increase in in the lengths of the plants as a whole, betweenn the nodes and in the length and breadth of the leaves. That at the base some of the branched off leaves did not go on with their growth but seemed to remain dormant while others ~~beca~~ became the growing tips. This seems to show that if the plants were injured ~~that~~ they might still go on growing from below by means of the dormant or undeveloped leaves that ~~that~~ are in reserve. This feature would be an important one as it it upon this that I base my belief that the kelp does not regenerate, after being cut, from the cut ends but that it ~~shoots~~ sends up young shoots from below to take the place of the injured members. ~~Because of~~ The action of the ocean ~~this~~ causes a number of lengths of stipes to show on any old plant as, the replacing must go on continually.

Aside from the tables and the facts contained, a number of general observations were made regarding beds and plants. Apparently the time of year when the ~~sori~~ spores drop must be in April or May, as young floating plants appeared in June and July. These plants appeared to be longer and larger as the season advanced. This would show a definite season for the ripening of the sori and the deposition of the spores. No other season for this type of developement is now known.

Plants in shallow water and plants in deep water seem to have ~~a certain~~ an equal area of, more or less, ~~free~~ floating surface upon the water. Also the growing tips seem to become fully developed so as to no longer function after the plant has

reached the surface. Thus the plant ~~length~~ seems to be rather definitely limited as to length. The plants on the inside of a bed spread over a given space but the area covered is roughly equal to that of ~~a~~ plants that lives in much deeper water.

Young Plants were watched that gained in length ~~fr~~ as follows:

June Six inches to a foot in length.

July ~~July~~ Three feet or more.

August Six Feet or more.

Two specimens of young plants are included as "Exhibit III".

Two specimens are included of growing tips as "Exhibit IV."

Respectfully submitted

Collaborator.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

La Jolla Cal. Sept.17th 1915

Dr.Frank K.Cameron,

Washington,D.C.

My dear Dr.Cameron:

Wednesday afternoon I was in San Diego and on my way back took a notion that I ought to be looking over the Kelp Products Co. I got there as the men were leaving but Mr. mith and Sellers came back and we talked things over and I started them towards town when Smith told me that Mr.Richardson, the Swift chemist was in San Diego and that he was going to leave the next morning. I therefore went back to town and after getting rid of Sellors who now says that he is Swift man, Ingot Smith and Richardson and took them to dinner at Budder's. From them I found that they had been out trying their cutter and harvester and that it worked well. I saw the pictures of it in operation and it looks like as good a one as the large one that Pete Lohman put up. However they tried drying and then they goet into trouble as they had to run the kelp through the dryer four times before it was dry and only got out four tons in the afternoon. This part of the work was very slow and they were rather depressed by this fact. They have now taken an option upon the Kelp Products Plant until the first of January and will try out their experiment for that length of time. Both men are strongly of the opinion that the kelp game cannot be worked except upon a large basis and that that is what they must get to before they can arrive anywhere with the proposition. They really are figuring on about a five hundred wet ton day to get what they want out of the kelp. The present plant is too small even for a good demonstration.

Yours sincerely

W. E. Bradley

1151 South Hope Street
Los Angeles,
Feby 22nd 1915

Capt. W. C. Crandall
La Jolla Marine Biological Dist.
S. California

Dear Sir,

I have received from the U.S. Dept. of Agriculture Bulletin No 150, "Utilization of the Fish waste of the Pacific Coast for the manufacture of fertilizer," by J.W. Turrentine in which reference is made that you have surveyed the kelp groves of the Pacific coast states,

I called on you some time ago with reference to obtaining material for fish fertilizer. as I am interested in the Ocean Fish Products Co and have recently turned my attention to kelp utilization as at my home town Santa Cruz we have erected a pier ½ mile long and are working for some use for it

As you are aware there are beds

of Kelp in that locality and the object in writing you is to enquire if in your investigations you estimated the probable quantity that could be harvested and brought to our wharf. this would enable me to determine the size of a factory - my intention would be to recover the Potash - and mix it or the dried kelp with fish scraps of which there could be obtained a considerable quantity at times. This would carry out Mr Sorrentons suggested combined kelp & scrap product at the Salmon Canneries - and the plant could be kept in constant operation -

I am Dear Sir

Yours truly

J. C. W. Stanley

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

September 23, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

I have just returned to my desk after a fortnight's absence and find a whole series of letters from you together with the manuscript of your report. All are very interesting indeed and very informing and I am obliged to you for keeping me so well posted. I have had a letter or two from the Chicago office of Swift & Co., but they contain no information that you do not already have. There is considerable activity in potash from feldspar and a great deal in potash from alunite. I am not surprised at Richardson, whom I know personally quite well, and his confreres having trouble over the drying of the kelp at the Roseville plant. I believe I could help them on this point if I could work with them on the ground, but my official superiors are unwilling apparently for me to do this. It seems a pity that the Roysters have withdrawn. I take no stock personally in their idea that the war will be over before the first of January or that Germany will immediately dump large shipments of potash salts into this country, but I have no more definite information on the subject than anyone else. I have heard nothing directly from the Roysters for the last five or six weeks, and it is nearly that length of time since the Virginia-Carolina people gave me any information. I have had one or two letters from them of the most cordial kind but containing no information.

Crandall, Capt. W. C. , #2, 9-23-15.

I am very much interested indeed in your report but will have to give it more careful study than I have yet had time for. I do not quite see what is the best thing to do with it. Of course it is important for us to have it on file in the Bureau, but some way or other it should be published but just how I do not at present see. As soon as I can secure time enough to go over it carefully I will take up the matter of publication and try to work out some scheme.

Sincerely yours,

Frank K Cameron

FRANK K. CAMERON.

In Charge.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J
PHYSICAL AND CHEMICAL INVESTIGATIONS.

September 24, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

The next time you go down to Long Beach it might be well to look up Mr. W. E. Privett, Treasurer of the Los Angeles Tuna Canning Co., who informs us that it is their intention to make fertilizer from sea kelp on a very large scale. Possibly this is the party you described to us in one of your letters some time since. I do not think it is worth while to make a special trip to see the man, but keep him in mind the next time you go that way.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J
PHYSICAL AND CHEMICAL INVESTIGATIONS.

September 25, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

The analysis of the ash of the kelp prepared by your fishermen friends is as follows:

Cl.	(Chlorine)	44.87 percent
SO_4	(Sulphur)	6.99 "
K	(Potassium)	29.73 "
	or	
KCl		56.68 "
H_2O	(Moisture)	2.33 "
Insoluble		0.27 "

It is a mighty good product and they ought to make something out of it. I hope they do.

I am off on another trip tonight as far West as Chicago, to be back in about ten days. I expect to have a heart to hear talk with the Swift people in Chicago and will write you results on my return, or sooner if it seems worth while.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

La Jolla Cal. Sept.28th 1915.

Dr.Frank K.Cameron,

Washington D.C.

My dear Dr.Cameron:

Received all sorts of stationary etc. today so will let you have a couple of barrels of it.

I received a request to sent to Kr.Wesson a few pounds of kelp on Saturday and will do so as soon as the sea goes down as we had a big run of surf during the last week.

I was over to the Roseville Plant Sunday afternoon and saw Blank enburg. He told me that the Swift people had taken an option on his place until the first of January. Their harvestor is working in good shae but they now have to go after the furnace and dryer and get those in shape as they have cracked the crown of the furnace and also have to reduce the slope of the drying drum so tha the kelp will not run through as rapidly as it does now.

Blankenburg is going ahead with some side work and has erected a furnace about five feet in diameter that is simply a big stove. Into this he places or is going to place dried in air kelp. For dr drying he has erected four poles and over two of them he has strechedc a cable and as one end is out in the bay he expects to haul kelp by means of grabhooks directly off from the barge. After the kelp is br brought to the shore, he will hang it up on wires and let it lay on the ground until it is air dried. This he figures will take two days The he will burn the kelp in the furnace and sell the burnt kelp. He says that he can get $100 for this ash and that the kelp will burn its

self. Smith of Swift Co. was to bring in a load of kelp for him yesterday so that he ought to be burning tomorrow if the plan works out as he expects. I will go to San Diego Thursday and will look in on him when I go in.

Today I received a visit from the Hercules Powder people. Mr. E.D.Armstrong,Supt. and Mr.Geo.H.Markel Sec.-Treas. and twp others gave me a cross examination from 4-6:30 P.M. They were interested in the size of beds, the growth, harvesting etc. They wanted to harvest only about 4000 tons daily. The men arrived this afternoon and will be around for about two days. They stated that they may send out a party to survey the beds on their own hook within a few days. Every thing goes to show that some of the big guns are going to get the kelp beds working soon to an advantage but whether the fertilizing end will come in for its share is a question. This now makes Wesson, McLeod, Swift men, Hercules men, as well as others that have been this way recently investigating the worth of the beds.

I trust that the report that I sent to you some days ago arrived in good shape. I retained a complete duplicate for reference.

Sincerely yours,

Oct 1915

Rcpld

Dear Crandall

I enclose report the best I can do. I have not been able to do as much as I wished but accept the results as a sign of good intentions. Hope you are well & enjoying yourself a letter or line will be received with pleasure

Best wishes.

Yours sincerely

W Hayden

Scripps Institution for Biological Research
of the
University of California.

La Jolla, California.

Oct. 6, 1915.

Dr. Frank K. Cameron,
Bureau of Soils,
Washington, D. C.

My dear Dr. Cameron:

Inclosed find copy of letter received from Dr. Haydon of Marshfield, Oregon. Dr. Haydon has shown great interest in our work as you knew before, and this evidence of his interest certainly entitles him to the slight request he has made for bulletins.

Will it be possible for you to furnish him a copy of #190 from Washington, as I do not know where to get it, and also to have him franked a couple of reports, #100?

It will be some days before I send you another report as my father-in-law died this morning and plans have changed materially for a short time.

Sincerely yours,

WCC:K

Oct. 6, 1915.

Dr. W. Haydon,
Marshfield, Oregon.

Dear Doctor Haydon:

Your observations on the growth of the nereocystis arrived a day or so ago and I certainly am very thankful to you for your interest and effort in behalf of the experiment on Kelp growth.

Your results come in very handily, particularly at this time, as I have been carrying on somewhat similiar observations near La Jolla, and am just putting in my report. The results that you obtained are extremely interesting and are the first results that we have had which give us an insight into the history of the Nereocystis.

Thanking you very much, both personally and on behalf of the department, I am,

Sincerely yours,

Collaborator.

WCC:K

U.S. GOVERNMENT PRINTING OFFICE

ADDRESS ALL COMMUNICATIONS TO
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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J

PHYSICAL AND CHEMICAL INVESTIGATIONS.

October 6, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, Calif.

Dear Crandall:

I have just returned from a ten day's trip largely devoted to running down potash matters. The interests controlled by the Armour Fertilizer Co. have commenced the production of a small daily output of potassium sulphate near Marysvale, Utah, and a company backed largely by Toledo capital is now organizing for the production of potassium sulphate from the Florence Mining & Milling Co.'s alunite holdings in Utah. I had a long talk with the Swift people in Chicago, including Richardson who had just returned from San Diego. They propose to go cautiously ahead with their experiments for the present. They feel that the harvesting problem is a settled one in its main features and there is no large difficulties to be anticipated and are of the opinion that by the first of January they will have settled definitely the difficulties involved in drying and burning the kelp. If these results turn out as they anticipate they will then submit a report to the Board of Directors of the Company for recommendations for a large expenditure to tackle the problem on a big scale for an annual commercial production. I learned on this trip that the Hercules people were very anxious to go ahead with the production of potassium chloride from kelp as there is a

big and growing demand for potassium chlorate as an explosive, probably to be used in mine work, blowing up trenches, et cetera, but they are hesitant about any large expenditure owing to the uncertainty as to the continuance of the war. The Swift people told me that they were quite willing to carry along Blankenburg with enough to keep him from starving to death and to help Sellers out financially at least for the present, but they did not care to commit themselves as to what would be done after the beginning of their big operations and they had put a first class technical force to work on the problem. The Virginia-Carolina people, with whom Mr. Weston is associated, are still speculating on kelp but their agents in New York are very unfavorably disposed towards it on the ground that it costs entirely too much to dry it. They admit, however, that they really do not know anything about it. They have bought up the bitterns of the salt works at Great Salt Lake and expect to produce about 3,000 tons of 15% K_2O salts from that source this winter. I have heard nothing further from the Richmond end of the concern. I learned in New York that the Standard Oil people were interested in obtaining control of the alunite deposits if the opportunity offered and that German interests working through Kuhn, Loeb & Co., were very anxious to obtain possession of them. I obtained some definite evidence which seems to confirm this latter statement but am not in possession of any definite, conclusive, evidence, but I do not know as that is of any particular importance to us except the strengthening of the evidence which I have already obtained regarding the efforts of the German interests to be associated with any respectable American enterprise that will take up the kelp exploitation. I also heard as an interesting piece of gossip in New York that these same German interests offered at a surprisingly reasonable figure the

Alsatian deposits to the Standard Oil people, but when the Standard Oil people demanded a guarantee of delivery after the war the German interests withdrew from the negotiations. There is, of course, a reasonable doubt that the Germans will own the deposits at the end of the war as they may then be the property of the French government, who would naturally not care to sell them to any foreign interest.

Having just returned to my desk I have had no opportunity to go over your report again but will get to it as soon as I can dispose of the accumulated mass of matters requiring more immediate attention.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.

In Charge.

La Jolla Cal. Oct.11th 191

Dr.Frank K.Cameron,
g
Washinton D.C.

My dear Dr. Cameron:

Monday I came back from San Diego by way of the Kelp Plant. At that time Smith was out with the harvester and was just coming in sight when I go there but I could not wait to se him. He is pleased with his machine howe ever and believes that he can get across with it in good shape. Also his cutting of the beds so far has made him feel secure as to the amount that is there of the kelp. So far no estimate has been made as I have asked for of the amount that they get on a cut of a definite distance with their har vester so that we can have an idea as to whether our estimate of the amount per cubic yard is long or short under field conditions.

I saw Capt.Cushman and the results of the survey that was made for the Hercules Powder Co. The acreage is a little larger that we figured. The amount per square yard he figured at about half our estimate. I am sure that they are wrong in that estimate as we undoubtedly have better dat than they had f or that. I am leaving for a short vacation to San Francisco on Friday and will try to get in touch with the Hercules people while I am there. If you think of anything else that you would like to have me do, telegraph C/O Comptroller's Office, Univ. of Cal., Berkeley,Cal. up to Saturday, the 23rd noon. I will leave my address there so that I may be reached in case of need.

Soon after I get back I will go to Los Angeles to do a lot of things t that have had to wait lately and then give you a good report on the situation there.

Outline.

Discipline Habit

VALLEY CONGRESS UNION-DO
U S A

ADDRESS ALL COMMUNICATIONS TO
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UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

FKC.J
PHYSICAL AND CHEMICAL INVESTIGATIONS.

October 18, 1915.

Capt. W. C. Crandall,
Scripps Biological Institute,
La Jolla, California.

Dear Crandall:

This is probably my last official communication to you from the Bureau of Soils as I have submitted my resignation to the Secretary of Agriculture. I am going to the Utah Potash Company to work out and install for them a plant to make potassium sulphate from alunite. Meanwhile, of course, I shall continue to be interested in all phases of potash work and will be specially interested in your own doings. And in any event we must keep up our personal interest in one another.

Please present my regards to your lady, in which my wife joins.

Sincerely yours,

Frank K. Cameron

FRANK K. CAMERON.
In Charge.

ZINCOGRAPH CO., NEW YORK, LITHO.

THE SOUTHERN COTTON OIL COMPANY

BLAIR BUILDING,
24 BROAD STREET.

SAMUEL T. MORGAN, PRESIDENT.
L. W. HASKELL, VICE-PRESIDENT.
T. S. YOUNG, SECOND VICE-PRESIDENT.
GEO. F. TENNILLE, THIRD VICE PRESIDENT.
EDW. E. COLES, SECRETARY AND TREASURER
C. FITZSIMONS, GENERAL MANAGER
H. H. WITHERS, AUDITOR

NEW YORK CITY

TECHNICAL DEPARTMENT
DAVID WESSON, MANAGER

October 23, 1915.

Capt. W. J. Crandall, Director,
Biological Station,
Lajolla, Cal.

Dear Sir:

I wish to thank you for the tub of kelp which arrived in very good order two or three weeks ago. Our work has proved so interesting that I would like very much to secure another tub, and will be very much obliged if you will have one sent to me as before, only please have the tub filled up to the top with all it will hold.

I have been studying up this kelp proposition, and believe I have a good way to handle it. I would be very glad to hear from you regarding the accuracy of the data which have been published in regard to the harvesting of the crop. I remember that we had some talk on this subject when I saw you in Lajolla last summer, and I came away with the impression that the harvesting was a comparatively simple proposition.

How much do you suppose it would cost to get an equipment which would furnish us 700 tons of wet kelp per day, and how much of it do you suppose could be secured in a year's time right in the neighborhood of San Diego?

Thanking you in advance for the courtesy, I remain,

Very truly yours,

David Wesson
Maager Technical Department.

DW/c

Oct.27th 1915.

Chief, Bureau of Soils,

Washington D.C.

Dear Sirs:

During the last week I have been in San Francisco taking my vacation but while there I found a number of things that could be attended to well so put in some time at work.

Mr. Markel of the Hercules Powder Co. was there and I had a long consultation with him. About some things he talked freely and about others he was very secretive. It seems that for the last three months the Hercules Powder Company has been experimenting with kelp in connection with their output and they have come to the conclusion that they can get what they want out of the kelp. They expect to get the juices out in some manner. Then they expect to take what they want out but they do not state what this is but they state that they are not after the potash in the kelp but that this is side issue with them but that there is another product which they will use in making their powder. They only want 1000 tons per day to get their product. They are now surveying the beds and also constructing a cutter. The cutter was not far enough along for me to go and see it but they expect to have it here in the South after a time. They were not satisfied with the type of cutter in use and so have figured out another. Mr. Markel was unable to explain it fully and I could not judge as to the efficiency of it. However it consists of a trough that lets down in the water in front of a barge or boat and then the kelp is drawn up by roller cutters and the weight of the cut kelp then keeps forcing the cut kelp up the trough until it get a board the barge when it is distributed by continuous belt. I did not get a good idea of

of the affair and so cannot judge it. However it is evident from the work that they are doing that they mean business and are going ahead.

I also saw the State Fish and Game Commission and find that they are getting interested in the matter of kelp a d that they are willing to cooperate in getting needed information as to growth etc. They were evidently much interested in the developements and are ggoing to watch affairs closely in the future. They will have a boat in these waters shortly that may be used for getting data. This will be a very desireable thing to have. I shall probably be able to name the man to go on the boat and if so can get a great deal of data readily and easily.

The Simmons Hdw. people have taken over the American Potash Co's. plant and I met their Captain in S.F. and he told me that Mr. Porteous was then in San Francisco and that they had just bought a large barge 60 X 100 and that they were dickering for one of the Crowley tugs. The purchase price of the tug was to be $10 000. This meant a great deal to me as these people have just completed their own survey of the kelp beds and they desired to satisfy themselves as th the quantities before going ahead. As they wanted not less than 500 tons daily, they areevidently more than satisfied as regards the quantity. They are reassembling the plant and expect to go at the business in short order. Mr. Simmons is on the ground watching many of the details.

After returning from the North I found letters from the Edison Chemical and the Southern Cotton Oil Co. asking for samples of dried kelp and asking also for information as to sources for getting dried materials.

As soon as possible I will go to Los Angeles and see what the exact developements are as they have doen a good many things since my last visit.

Sincerely yours,

THE SCRIPPS INSTITUTION FOR BIOLOGICAL RESEARCH
OF THE
UNIVERSITY OF CALIFORNIA

LOCATED AT LA JOLLA
NEAR
SAN DIEGO, CALIFORNIA

LA JOLLA, CALIFORNIA, 11/1/15

Mr. David Wesson,

24 Broad St.,

New york City, N.Y.

My dear Mr. Wesson:

Your letter of the 23rd is at hand. I am glad that the kelp got to you in good shape. The bucket gas packed tight at this end but the bleeding of the kelp in that long haul must account for the apparent loss in volume. The bucket was really packed as full as my man could get it.

I believe that the methods that are in use do the work of cutting w well. In the sudden increase in the desire for kelp, there are some new schemes on foot but how the new ones will come out is doubtful. The method in use you are familiar with.

For a ten hour day, it would take two cutters or harvesters at a price of $3000 each and 7 barges @ $2 000 each to harvest 700 tons per day if everything were efficiently arranged and the haul were one of the short ones. The great demand of the big companies that has sprung up is going to

THE SCRIPPS INSTITUTION FOR BIOLOGICAL RESEARCH
OF THE
UNIVERSITY OF CALIFORNIA

LOCATED AT LA JOLLA
NEAR
SAN DIEGO, CALIFORNIA

#2. D W

LA JOLLA, CALIFORNIA,

You are the four'h one who has called for from 700 to 1000 tons of wet kelp per day from the local beds i.e. Point Conception to San Diego. This means that the beds would have a hard tussle to supply demands such as these as the total per year is pretty high. Without some concerted action on the part of the different firms desiring the kelp and definite agreements as to the trritory each will work, I am afraid that there will be rather a di ficult mess to untangle when all get going. That is a am ter that at present is up to the companies as there is no one that can control them.

Yours truly,

W. E. Ritter

THE SCRIPPS INSTITUTION FOR BIOLOGICAL RESEARCH
OF THE
UNIVERSITY OF CALIFORNIA

LOCATED AT LA JOLLA
NEAR
SAN DIEGO, CALIFORNIA

LA JOLLA, CALIFORNIA,

Nov 7th 1915.

Mr.R.O.E.Davis,

Washington,D.C.

My dear Mr.Davis:

Your letter of the 1st is at hand. I will try and get a line on the material that you want but I am afraid that it will be impossible to get the carbonaceous matter free material.

Yours truly

W. Chandler

THE SCRIPPS INSTITUTION FOR BIOLOGICAL RESEARCH
OF THE
UNIVERSITY OF CALIFORNIA

LOCATED AT LA JOLLA
NEAR
SAN DIEGO, CALIFORNIA

LA JOLLA, CALIFORNIA,

Nov. 20th. '15

My dear Dr. Cameron:

That your letter came as a surprise is sure. I of course knew that you anticipated getting out of the Deoartment if possible but yonr announcement of it was sudden. I certainly hope that you have a dandy place and that you will be sucessful in the new work. If any man deserves sucess you certainly do and I am confide t that you see your way clear to make a sucess. I still feel that your place is in the kelp end but as things did not turn out right, I am glad that you have anothere work thaf is associated with your years of endeavor. All sucess to you and your work. If in any way I can be of asistance to you, I hope that you will give ~~th~~ me the chance. Laura often speaks of you and wishes that you might be with us to enjoy La Jolla. She always enjoyed your visits and talks about the garden and flowers and your discussions of them. You are at least twicw welcome whenever you come this way. If you or Mrs. Cameron get our way, remember that our house is open and the latchkey hangs out.

For myself, I have been mighty busy oflate which will explain my slow answer to your letter. I am just starting the new library building, completing the pier, building a mile of boulevard, buidling some more cottages, running the Station, helping a State Teachers' Ass'n, etc. Incidentally I just put in about a week getting infromation for the Bureau. Was In S.F. for a week a short time ago. Thus I am living and moving.

With best regards to yourself and family,

Yours sincerely,

W. C. Crandall

ADDRESS ALL COMMUNICATIONS TO
"CHIEF, BUREAU OF SOILS."

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

La Jolla Cal. Nov 20th 1915

Chief,Bureau of Soils,
Washington D.C.

Dear Sir:

In compliance with my usual custom, I have just completed a visit to the local Kelp Companies and f nd the follwoing conditions:

San Diego:

Kelp Products Co., Pres.Mr.Blankenberg has leased the plan toSwift and Co until Jan.1st. Mr.Blankenberg is atttempting some side work in drying and grinding. He has erected several lines of wire and is hanging the green kelp on the same and after two or more days is collecting the same and burning it in an improvised furnace. This dried kelp is dry enough to burn of itself after this drying. The methods used are crude and much materail is lost on the ground and through the salts blowing away. The work is on a samll scale and will rpobably fail.

Swift and Co. have constructed a harvester which is nearly the same as the Lohman cutter previously described and they are able to harvest some fifty tons per hour. H wever they are having some trouble so that continuous cutting is not possible as yet. They are drying some of the kelp in the old rotary drier of the Kelp Products Co. and this they are grinding for fertilizer. They have taken out the old Fess burner and have installed the usual blast oil burner with compressed air feed. They are expecting two more rotary driers soon and as soon as these are here and installed expect to get down to real production. Their process is simply to harvest, cut, feed slowly by conveyor belt,dry in rotary, gring and sack.

E.A.Edmonds on 28th St., San Diego. Has secured an old lumber wharf and is harvesting some 4 or 5 tons of wet kelp per day by pulling and cutting with a knife onto s seven ton fishing boat. This kelpis then put on the wharf and dried on lines or else scattered out on the floor of the wharf. It is then collected after some two days and put in a furnace and allowed to burn of itself. One part of their burn I am sending to you under separate cover as an interesting specimen. I have been unable to see or talk with Mr.Edmonds personnaly as yet altho I have been to his office two times and have tried several times to get him over the phone. I do not know what he expects to do eventually or how extensively he expects to go into the work. There are no expert men on the job and I suspect that they are jst taking a flier.

Quisan Plant at Roseville closed and no information available as o what has been done or where the people have gone. This is a Pasadena experimant.

Longbeach:

American Potash Co. Mr.Gleason Pres. On account of financial difficulties company has now its good name and some patents but has sold its inerest in the lease of land in Longbeach to the Pacific Products Co. Mr.Geo.Simmons Pres. The terms of sale were $8000 allowing the Am. Pot.Co, to pay 37½¢ on the dollar to its creditors. Company may be said now to be defunct. However I believe that there has been recently a well determined effort on the art of the officers to do right and get something out of kelp. Negotiations were held with the Dupont people, Royster people and their own efforts to get on a sound basis as they had done the preliminary work and had data to show that they could produce the ground kelp for $15.32 a ton. At present prices this would have given them a good business but they needed about $26 000 to complete

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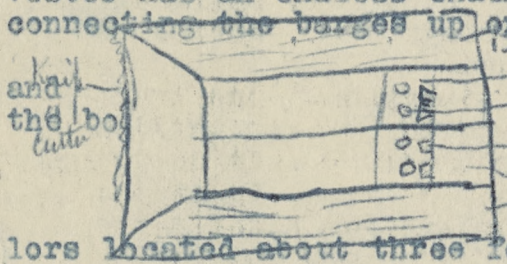
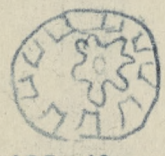
PHYSICAL AND CHEMICAL INVESTIGATIONS.

complete their plant. They also had data to show that the potash might e secured for $75.00 per ton but this would require about $10 000 more. They were unable to get the money and tried to sell out for $40 000 but ere unable to do so and then were forced to accept the offer of Mr.Naylor for Mr.Simmons of $8 000. The figures are about 65% higher than was estimated by the Bureau of Soils. Their figures were obtained from a run ade for Mr.McLoud for the Royster Guano Co. and were obtained separately by Mr.Mc Loud and Mr.Porteous.

American Products Co. Mr.Simmons Pres. have built a high board fence about some five or six acres of land and placed a watchman on duty so that none may know of their doings. Inside the fence they are adding to the buildings of the old Am.Pot Co. and have at present installed in the old vat building double banks of vats 40 in all which have 300 tons capacity daily. These vats are to be used in a fermentation process,I believe. ther work is still to be done. They have a 500 ton barge in front of the plant and are negotiating for a good sized boat to handle the same Theyhave a receiving elevator that will hold some 250 - 300 tons of wet cut kelp. To be installed yet is a preheater,presses filters etc to separate the slats from the cellulose. Under construction and ready to be launched next Monday from Joe Fellows Boat Yards at San Pedro is a harvester that is extremely interesting. It is a revised edition of the old cutter. It is we well built and ought to do the business.It is about 40 x 50 feet and consists of practically two barges built in pontoon fashion The front od the harvester has an endless chain scicle that runs along the bottom of the floor connecting the barges up one side and over the top and down the other side.



The cut kelp would then run onto the floo and be forced by the movement of theboat onto aprons that would c carry it up over some grinding machines. The harvester would be propelled by the four propellors located about three fourths of the way back between the barges and which are below the floor that has bee raised so as to give a free movement of water between the barges. The hope is that these propellors will both propell the boat and suck the kelp in to the endless carriers. The kelp then is taken after being raised by the endless carriers into two grinders which are made by the Fulton Iron Works of San Francisco. These grinders consist practicaaly of two eccentrically placed sprocketed wheel the larger one being some 4 feet in diameter and the i inner one being about to feet. the wheels are about 12" in thickness. In the spockets of the outer wheel are to be placed sieve plates so as to thoroughly grind the kelp



which will then be raised by elevators to the top of two towers and then allowed to run down into a barge that will be made fast to the stern. The two barges will serve as ballast tanks and can be filled with ater to sink the cutting knives to any desired depth. They expect to run the knives at a depth of about six feet. The whole affair is extremely substantial and I am much interested to see how it will act. This harvester and grinder will remain on the beds and as it is self propelled will supposedly be able to take care of itself. From hints dropped here and there I can anticipate somewhat the process that the Company is going to use. The ground kelp is to be brought in placed in the receiving bin, then passed through a preheater of some kind at a temperature of 500. This is expected to make the kelp

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PHYSICAL AND CHEMICAL INVESTIGATIONS.

leathery so that it may be pressed. This pressed material is then to be t treated with some substance that I suspect is lime in order that fermentat tion may take place and they have figured this out so that the process may take about three days. Then the resultant material is to be used for maki ing boxes. At the time of pressing or of treating they expect to get out all the salts. This has been done they claim on some 1000 pound runs in an experimental plant successfully and that the salts obtained are in excess of the results of the old methods. The treatment of the material will give them lime acetate. The latter is a guess from remarks dropped at various times when discussing the plant and the doings of the Hercules Powder Co. The fibre as they call it or cellulose is to be used to make nail kegs and a material that will serve as a substitute for horn to be used in handle material for knives etc. Mr.Naylor was inquisitive about Imperial Co. and I incidentally asked him if he were interested in cotton and he denied that he was and then a load of cottonwas announced and he quickly explained that this was to be used for caulking the vats and that they wee not going to make gun cotton or material for powder. He said that I looked suspicious and wanted to put me right. However he has a good many guessing right now in and abot Longbeach. His high board fence may be the cause of it. What I obtained from Mr.Naylor and Mr. Porteous is confidential and they were very courteous to me and took me over the plant and over their harvester. They promised to send 50# of slats to you as soon as they have them to send. The capacity of the plant is to be 300 tons of wet kelp per day. They expect to be running in in sixty days and from the way that they have gone at things,I believe that they may. That they mean business is plainly evident. How they are going to do their work and what they will get is a problem yet for me. That potash salts are to be a by product is a certainty.

Coast Porduction Co. W.E.Privett Pres. is no more but the "Sea Products Co. has taken its place with Mr.Privett as Pres. This propositio is simply harvesting,cutting,drying in a rotary, grinding and shipping. They have put $22 000 into the plant and are expecting to enlarge their plant by the addition of t o more rotary driers. They have shipped some five carloads of the ground kelp and figure on at present handling about fifty tons of wet kelp per day. One plant burned down and they believe that the fire was due to spontaneous combustion caused by putting the hot ground kelp in the sacks and storing. They are considering buring the kelp and shipping only the salts. They also are very secretive but only because of lack of knowledge as to what is already known about kelp. You will probably receive some questions that I did not feel at liberty to answer. Mr.Previtt is a young man,manager of the Los Angeles Tuna Canning Co and he and Mr.Judson are taking a flier at kelp fertilizer production.They have the small plant and are using the old Lohman harvester. Lohman is doing the cutting for them and is wasting a good deal of the kelp according to Mr.Naylor. Mr.Naylor complained about the harvesting but I suspect that all harvesters yet constructed will do that to some extent.

Pacific Products Co. Mr.Metz Pres. Now building but nothing in it. Office building. Nobody about and the lock on the door much rusted as if nothing were being done altho the calendar in the office showed that some one had torn off the sheets so that November was shown. Apparently no activity of any note is taking place here. They were indefinite in what

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BUREAU OF SOILS,
WASHINGTON, D. C.

PHYSICAL AND CHEMICAL INVESTIGATIONS.

#4 Chief B. of Soils.

r

they wee going to do according to my last report.

Potassium Mnf. Co. Pres.Armstrong. Saw Mr.Armstrong and he stated that they were not doing anything more than when I last saw them. Their plant at El Secundo still shows the same degree of progress as reported some months ago. Mr.Armstrong seemed different from his usual self and did not try as much bluff as I expect of him.

Hercules Powder Co San Francisco (Indirect information secured thru Mr.Naylor.) They have contructed and are using the cutter devised by them. This cutter seemd t Mr.Naylor to be rather flimsy and he doubted whether it would stand the hard work required of it. He explained their process as being one of fermentation. They expect to take the wet kelp mix itwith lime and after 14 days get lime acetate which then will be sent to some of their plants to be made into acetone which I believe is a solvent that they use in powder making. They expect to run about 1000 tons per day and this will mean a plant to handle 14000 tons if the process takes 14 days. It was Mr.Naylors discussion of the Hercules methods and his own claims that made me believe that he expecte to use somewhat the same methods but that he expected to get his results in a much lesser time. Both are fermentation plants. The Hercules peope are now having a survey made of the kelp beds from San Diego tp San Francisco. Mr.Lobenstein is making the survey in a small boat owned by Harry Hutchinson of San Diego.

Mr.Porteous made a survey for Mr.Naylor and he states that the beds are changed from m reports of 1911 and 1912 but that there is a consistent variance. Some beds that I reported as heavy,he now finds thin. Some of the beds that I reported thin are now thick and that certain exposed beds as on St.Nicolas Is. are absent or nearly so. Generally speaking he found the San Diego beds thinner, the San Pedro beds larger and thicker, the Santa Barbara beds about the same and the is ands beds usually thinner.

I have used the better part of this week getting these reports and spent Wed. Thurs and Friday in and about Los Angeles seeing plants and interviewing men connected with the kelp industry.

Respectfully submitted,

C. C. Bradshaw

Collaborator.

Nov.29th 1915.

Chief,Bureau of Soils,

Washington,D.C.

Dear Sirs;

I am sending through the mail today a sample of some material that Mr.Geo.Simmons found in their Cardiff plant. There aresome 500 sacks of the stuff and I suspect that it is ground kelp plus some ground phosphate rock.

Mr.Simmons was here today and we had a talk about the kelp situation. He said no more than I reported to you recently but was very anxious to cooperate with us in the work that is being done. He will keep us advised as to progress in their plant particularly the harvesting end of it.

The Hercules people are supposed to have given their new harvester a try ut last Saturday. Their plant will require about 40 acres and is to be covered with vats that are about ten feet deep.

Yours sincerely

W.C.Crandall

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INDUSTRIAL BUREAU

Los Angeles Chamber of Commerce

Phones F-4066
Broadway 7716

ARTHUR W. KINNEY, INDUSTRIAL COMMISSIONER

December
Sixteenth
Nineteen
Fifteen

Dr. W. Clarence Crandall, Business Mgr.,
Scripps Institute for Biological Research of
the University of So. California,
La Jolla, California.

Dear Sir:

I am enclosing you herewith a copy of proposed ordinance to amend Ordinance #245 (New Series) entitled "An Ordinance regulating and licensing certain kinds of business in the County of Los Angeles", the same relating to the regulating and licensing of the cutting of kelp, sea moss or seaweed within three miles of the shore line of the mainland or of any island of Los Angeles County, and re-numbering sections 90 and 91 of said ordinance.

The Industrial Bureau is advised that you have made exhaustive investigations with regard to the kelp industry on the Pacific Coast, especially with regard to the extent of kelp beds and the growth of the same and that you would be able to advise us to what extent our Southern California kelp beds are used as a spawning place for fish. It is with respect to the latter phase of your investigation that the writer takes the liberty of addressing you. I assure you that any information will be appreciated and duly reciprocated should the occasion for so doing ever arise.

At the present time several concerns are figuring on the establishment of large enterprises in this section which will involve the use of kelp in considerable quantities and you can see that it is important for us to be informed as to what effect the continuous harvesting of kelp would have upon the life of these kelp beds and upon their desirability as a spawning place for fish.

Again thanking you for your opinion as to the foregoing and assuring you that it will be of great value to us in our work of industrial development, I am with kind regards

Very truly yours,

Arthur W. Kinney
Industrial Commissioner.

K-L

Form 1204

CLASS OF SERVICE	SYMBOL
Day Message	
Day Letter	Blue
Night Message	Nite
Night Letter	N L

If none of these three symbols appears after the check (number of words) this is a day message. Otherwise its character is indicated by the symbol appearing after the check.

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT

GEORGE W. E. ATKINS, VICE-PRESIDENT BELVIDERE BROOKS, VICE-PRESIDENT

CLASS OF SERVICE	SYMBOL
Day Message	
Day Letter	Blue
Night Message	Nite
Night Letter	N L

If none of these three symbols appears after the check (number of words) this is a day message. Otherwise its character is indicated by the symbol appearing after the check.

RECEIVED AT 10by b 22

LONG BEACH CALIF 12.26 pm dec 18 1915

CAPT W C CRANDALL

LAJOLLA CALIF .

DO FISH SPAWN IN KELP SIX FEET FROM SURFACE IS CUTTING INJURIOUS TO FISHERIES, IF LIMITED TO SURFACE CUTTING ANSWER OUR EXPENSE .

AMERICAN PRODS CO .

Written 1254 pm

Fish spawning on Kelp Beds
Advises 6 ft cutting depth

Dec.18th 1915.

Mr. Authur W.Kinney,

Industrial Co mmissioner,

Los Angeles,Cal.

Dear Sir:

In reply to your letter of the 16th,will state that the kelp beds are a place for the spawmning of some fish but according to the best authorities that we have the cutting of kelp from the beds would not affect this spawning injuriously.

In order that you may state definitelt concerning the runs of certain fish,will state that :

Barracuda spawn in unknown places,not in kelp beds. Feed on edge.

Albicore " " " " ". Usually found away from shore.

Tuna " " " " ". "" "" "".

Rock Cod found on rcky beds but not usually close to shore.

Kelp bass probably spawn in beds. Would not be affected.

Any oceanic eggs laid on the kelp float away in time and only a limited number would be destroyed so that total number would not be under normal probably.

The problem is an interesting oneand not much definite information can be given. Deductions must be made to a large extent from the habits of the fish as known also the fact that the number of eggs laid per fish is so great the local cutting of a kelp bed during the time that a certain kind of fish is spawning.

Kelp beds are rather places for feeding and hiding for fish and as no bed would be allowed to be destroyed, the fish would still have a place left for getting their food.

Concerning the extent of the kelp beds, I can best refer you to the report of " Potash from Kelp" Report #100 U.S. Dept. of Agriculture.

In your Ordinance #---, I note that you have not limited the depth to which the kelp may be cut. Because of the growing tips from the lower layers and the consequent stopping of growth for a longer period, I am firmly of the opinion that it is to the interests of all to place a limit in depth. Arbitrarily I have advised a depth of six feet for all cutting. i.e. not to a greater depth.

I shall be glad to advise with you concerning the kelp situation at any time. In sincerely hope that no financial difficulties will be placed in the way of the people interested at this time as the question is one that means experiment for them as well as for the county. They need fostering.

Yours sincerely

Dec.20th 1915;

Chief,Bureau of Soils,

Washington D.C.

Dea r Sir:

Your recent letter concernigg pictures received. These were taken by Mr.Geo.Simmons and I written him and asked him to let us have the negatives of the same. As I have heard nothing from either the owners or the builder of the harvester,I suspect that it is not working as all were very anxious apparently for me to see it work when completed. Both parties were to tell me as to how it went. I doubt if it was a success.

Concer ning the ash,I have s en Mr.Smith of the Swift pe ple and I will send to you the first of the week some of the material that is really hte salts. It will be the leaves and small parts of the stems that have gone through t e rotary drier and gone into the chamber at the base of the stack and there caught fire and burnt up. The e will be about 100# of this and it will cost you notying but the transportation. I am therefor taking the liberty to forward the same as soon as we can collect a sufficient amount.

Swift and Company have been getting a lease on some property in th business district of the waterfront of Sa Diego. They desire to put up ten units of rotary driers. I believe that they will get a franchise for their factory. In this matter I have been approached by the local City Commisioners and put in a word in favor of movement.

From Los Angeles,I recently received a copy of an ordinance that I am enclosing. This I answered and also made a few suggestions as to some additional matter.

Locally there are now several plants of small proportions working.

L.A.Blockman a local banker s supporting these. One plant is the one I reported at 28th St., San Diego,under the management of Mr.Edmonds. Then the one at Roseville next to the Swift plant is also subsidized by Blockman. There are a half dozen places along the coast between Carpenterial and Santa Barbara that are w rking in the same manner and f for the same man. The active manager is a man who is related to Blockman named Green,. The general process is to gather either on shore or in small scows, bring to shore, put on racks to dry for 24-48 hours, then burn in an open furnace. They get about 1000 # per day per plant.

At Coronado a man named Toews is doing the same thing. He has a a propsition for the Coronado Hotel manggement to keep their beach clean.

Last week Swift shipped 30 tons of dried kelp to Chicago.

Yours truly,

W C Crandall

Dec.20th 1915

American Products Co.,

Long Beach Cal.

Dear Sirs:

While here recently, Mr. Simmons left some pictures of your new harvester. Enclosed find a request from the Department that explains itself. I suspect that these pictures that mentioned are some personal ones of Mr; Geo. Simmons.

I trust that you received my reply to your telegram in time. I happened to be away yesterday and so only got the message this morning. The best authorities that I know are Dr. David Starr Jordan and Dr. Evermann. Both have stated that the cutting of the kelp will not affect fisheries.

The question would probably be asked concerning the main food fishes. Of these barracuda, albicore, tuna, rock cod would certainly not be affected in any way other than that they come to the beds for food.

Kelp bass are always deep and top cutting would not affect them in so far as I can see.

Yours truly

W. C. Crandall

Dec. 29, 1915.

Mr. Arthur W. Kinney,
Industrial Commissioner,
Los Angeles Chamber of Commerce,
Los Angeles, California.

My dear Mr. Kinney:

This morning I received a telegram from the Hon. Mr. Whitney, Chief of Bureau of Soils, Washington, D. C., asking me to request Los Angeles County to so word the ordinance # 245, new series, that it would exempt the United States Department of Agriculture from payment of kelp license, and to make it as easy as possible to carry on further investigations on their part in the utilization of kelp. Also, I am advised that Mr. Davis, Acting in Charge, Kelp Investigations, Bureau of Soils, Washington D.C. will leave Washington the first of January and will arrive between the 8th and 10th to investigate further the present kelp situation and to ascertain what the Bureau of Soils may possibly be able to do further.

Realizing from your letter of the 16th of your desire to cooperate with us in starting a great industry and trusting that you will realize the great amount of work that the government has already done in fostering

A.W.K. #2. 12/29/15

the kelp investigations. I know that you will be pleased to consider very carefully the request of Mr. Whitney and as soon as Mr. Davis arrives to confer with him.

I shall probably call with Mr. Davis as he is making his visit through the southern part of the state.

Very sincerely yours,

Collaborator.

WCC:K

COPY.

Legislation

December 29, 1915.

Prof. Milton Whitney,

Chief of the Bureau of Soils.

Dear Sir:

In sending Dr. R. O. E. Davis of your Bureau to the Pacific Coast to report upon the advisability of further work in the development of potash salts from kelp, I deem it advisable that you have him confer with the Governors of the States of California and Washington with respect to legislation for the conservation and utilization of the kelp beds along the Pacific Coast and for the promotion and protection of the growing industry of manufacturing potash from kelp, and you are authorized to have him make the following suggestions as to what the Department believes should be embodied in a law designed for the purposes stated:

(1) Assertion by the State of ownership of all kelp beds along the coast below the line of high tide and for a distance of one marine league to three geographical miles out to sea from low water mark.

(2) Prohibition against the taking of kelp from any such beds except in accordance with the terms of the law and the rules

and regulations authorized to be made.

(3) Appointment or designation of a board or official who will be authorized and required to administer the law and to make all needful rules and regulations for the purpose of carrying it into effect.

(4) Vesting authority in the board or official to lease kelp beds or parts thereof to responsible persons or corporations for periods not exceeding twenty years, with the power in the board or official to renew the lease for additional periods of not to exceed ten years each, if compatible with public interests. Every lease shall be conditioned upon--

(a) Payment by the lessee of the cost of survey and marking of the leased bed;
(b) Payment by the lessee to the State of a royalty not exceeding one dollar per hundred tons of wet kelp harvested;
(c) The prosecution by the lessee of bona fide harvesting of kelp for such period in each year, not less than fifty days, as may be prescribed by the board or official; and
(d) Such other conditions not inconsistent with the law as may be prescribed by the board or official;

(5) Direction to the State engineer upon application of the board or official to survey and plainly mark the kelp beds by buoys or such other means as the board or official may deem advisable;

(6) Provision authorizing the Secretary of Agriculture of the United States to select such kelp beds as may be agreed upon with the board or official for scientific or experimental purposes, and to take therefrom without cost to the United States, except the

cost of marking the beds, kelp in such quantities as the Secretary may deem necessary for such purposes.

(7) Penalties for any violation of the provisions of the law or any of the rules and regulations prescribed by the board or official.

(8) Power in the board or official, upon due notice and hearing, to forfeit and cancel any lease upon the failure of the lessee to carry on bona fide operations during the prescribed minimum period in any year of the lease.

The law should contain the general and fundamental principles of control of kelp beds, but should clothe the officials who are to be required to administer the law, with ample power to make rules and regulations to carry out the purpose and intent of the law. There are many details of administration of subject matters of this kind which most advantageously may be left for rules and regulations to be prescribed by the administrative official. The advantage of leaving the details to administrative officials lies in the fact that administrative rules and regulations may be made or altered to meet changing conditions, whereas amendments of the law can be procured only by action of the legislature, which in many states assembles for a short period in every other year.

The regulations prescribed by the board or official should require that kelp be cut and not pulled up, the cutting to be done

not more than ten feet below the surface. In California the regulations should prohibit the cutting over within sixty days after harvesting of any kelp in the region south of Point Sur, and in Washington that no harvesting shall be done in the Puget Sound region between January 1 and July 21 of each year and limited to one cutting during the cutting period.

Very respectfully,

(Signed) D. F. Houston.

Secretary.

(C O P Y)

Dec. 30, 1915.

Hon. William Kettner,
House of Representatives,
Washington, D. C.

My dear Kettner:

I understand that you have a few copies of the Report of the Industrial Relations Committee, with full Hearings, that you are reserving for libraries. At the present time, we are undertaking considerable amount of study along sociological lines amongst our staff members and a copy of this record would be better used probably in our library than in any other library in your jurisdiction, and I hope that you may see your way clear to let us have one of these copies.

I have taken up the matter with Mr. Capps again, concerning the land titles along the ocean front and trust that we will have everything in Mr. Clay Tallman's hands very shortly.

With best wishes to you and Mrs. Kettner during your sojourn in Washington, and for the New Year, I am,

Yours very sincerely,

WCC:K